



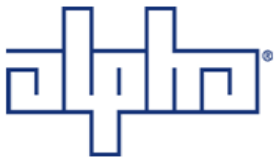
Tri Power X33 Mod HP®

Operating and Maintenance Manual

Rev 1.20

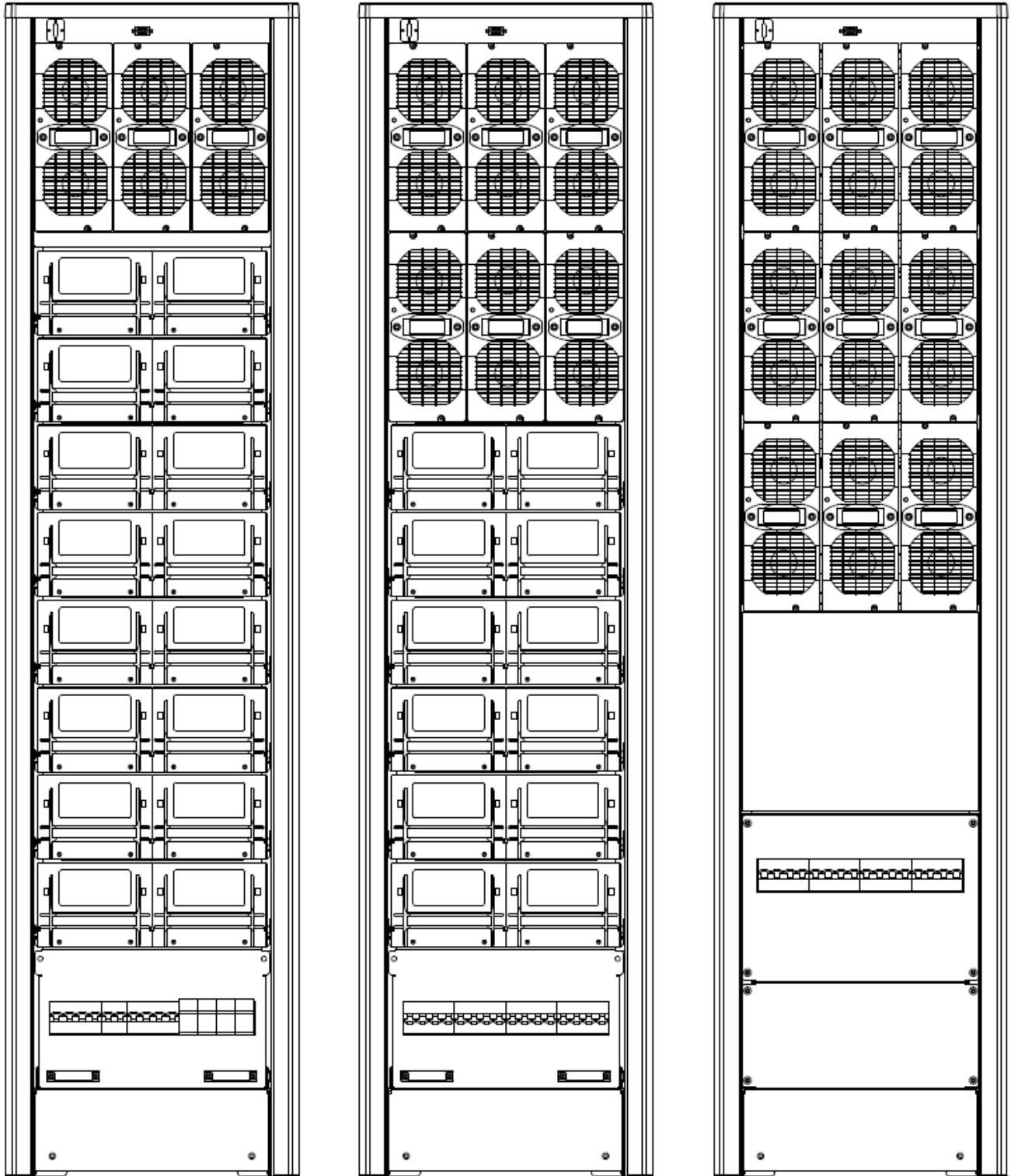
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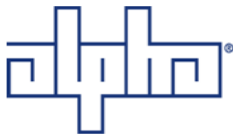
Tri Power X33 Mod HP

Operating and Maintenance Manual



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1. Introduction

1.1 Overview

Congratulations on your purchase of a ALPHA UPS Tri Power X33 Mod HP product.

Thanks to the powerful UPS Tri Power Mod unit your critical equipment will be protected by a constant and reliable supply of power.

ALPHA is specialized in designing and producing UPS units. The UPS Tri Power X33 Mod HP system is unique, modular and the state-of-art generation of three-phase medium power UPS units.

Highly reliable, low running costs and excellent electrical performance are but a few of the great features of this innovative UPS. Moreover, the criteria and methods that ALPHA uses for its design and production comply with the strictest quality standards.

The product is produced at an ISO14001 certified factory in full compliance with the eco-design laws.

The UPS system Tri Power X33 Mod HPe is made in compliance with the existing European Community directives and with the technical standards as certified by the Declaration of Conformity issued by the Manufacturer and enclosed with this manual.

This publication, simply defined '**manual**' herein, contains all the information for the installation, use and maintenance of the equipment specified in the Declaration of Conformity.

This equipment will be referred to simply as '**equipment**' or even '**machine**' in this manual and is manufactured by ALPHA whose address can be found further on in this chapter.

The contents of this manual are intended for an operator who has already been instructed on the precautions to be taken in relation to the presence of electricity.

The persons to whom this publication is addressed, normally defined '**users**', are all those

people who, for their field of expertise, have the need and/or obligation to provide instructions or work directly on the equipment.

These people can be the following:

- managers;
- heads of operating areas;
- department heads;
- operators directly concerned with transporting, storing, installing, using and servicing machines from the moment they are put on the market up to the day they are scrapped;
- direct private users.

The original text of this publication, written in the Italian language, is the only reference for solving any disputes concerning the interpretation of translations into Community languages. This publication is to be considered an integral part of the equipment supplied and, as such, must be kept for future reference up until the equipment is definitively dismantled and scrapped.

1.2 Purpose of this manual

The purpose of this manual is to provide instructions for using the equipment safely and to carry out routine maintenance procedures.

Adjustments and extraordinary maintenance jobs are not dealt with in this manual as they are reserved exclusively to assistance technicians, who must observe the technical and design characteristics for which the equipment was made when working on it.

It is essential that this manual is read through but, it is not a substitute for the expertise of the technical personnel who must have had adequate preliminary training.

The intended use and configurations envisaged for the equipment are the only ones allowed by the Manufacturer; do not attempt to use the equipment in disagreement with the indications given.

Any other use or configuration must be agreed on beforehand with the Manufacturer in writing and, in such a case, will be an appendix to the manual.

For its use the user must also comply with the specific laws of work that exist in the country where the equipment is installed.

Reference is also made in this manual to laws, directives, etc., that the user must know and consult.

1.3 Where and how to keep this manual

This manual (and its appendixes) must be kept in a safe, dry place and always be available for consultation.

We suggest making a copy and filing it.

If information is exchanged with the Manufacturer or assistance personnel authorised by the former, please refer to the equipment's rating plate data and serial number.

The manual must be kept for the equipment's useful life cycle and, if necessary (e.g. damage which prevents it being consulted even partially) the user must ask the Manufacturer for a new copy, quoting the publishing code on the cover.

1.4 Manual update

The manual reflects the state of the equipment at the time of going to market. The publication complies with the directives in force at such a date. The manual cannot be considered inadequate if updates of standards or changes are made to the equipment.

Any addition to the manual which the Manufacturer deems fitting to send to the users, must be kept with the manual, becoming an integral part of it.

1.5 Collaboration with the user

The Manufacturer is available to provide additional information and will take into consideration any suggestions made to improve this manual to bring it even closer to the requirements for which it was drawn up.

If the equipment is sold, which always includes handing over this operating manual, the primary user must notify the Manufacturer, giving him the address of the new user so the latter can be reached if there are any communications and/or updates deemed indispensable.

ALPHA reserves the property rights of this publication and forbids the total or partial reproduction of it without prior written consent.

1.6 Manufacturer

The equipment's identification data are given on the ID plate.

1.7 Responsibilities of the manufacturer and warranty

In order to use the warranty supplied by the Manufacturer the user must scrupulously comply with the precautions indicated in the manual and in particular:

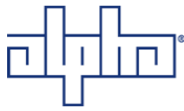
- to always work within the equipment's limits of use
- to always carry out constant and accurate maintenance
- to have persons use the equipment with proven capabilities and skill and adequately trained for the purpose

The Manufacturer declines all liabilities, direct and indirect, resulting from:

- disregard for the instructions and use of the equipment not as described in the operating manual.
- use by personnel who have not read and understood properly the contents of the manual
- a use failing to conform to the specific laws existing in the country of installation
- changes made to the equipment, software, operating logic that were not authorised by the Manufacturer in writing
- unauthorised repairs
- exceptional events

When the equipment is sold to a third party this manual has to be supplied with it; if the manual is not given to the new user then all purchaser rights are automatically invalidated, including warranty terms where applicable.

If the equipment is sold to a third party in a country of a different language it is the responsibility of the original user to provide a true translation of this manual in the language of the country where the equipment is going to be used.



1. introduction

1.7.1 Terms of warranty

UPS Tri Power X33 Mod HP is supplied with a warranty, limited to material defects of the UPS and its components.

The instant an anomaly occurs on the product, contact the ALPHA Technical Assistance Centre who will provide all the instructions on how to proceed. **Do not return anything without prior authorisation from ALPHA.**

ALPHA will provide further instructions on how to proceed.

This warranty is not valid if the UPS is not started by a correctly trained specialized technician.

This warranty does not cover damages or losses caused by:

incorrect use, abuse, negligence, carelessness, unauthorised repairs or changes, incorrect installation, inadequate environment, accident, force majeure or inappropriate application, atmospheric events, etc.

If, during the warranty period the UPS is found not to conform to the characteristics and performances described in this manual, ALPHA, at its discretion, will repair or replace the unit (or its components).

All pieces repaired or replaced remain the property of ALPHA.

ALPHA is not liable for costs such as: loss of profits or failed turnover, loss of equipment, loss of data or software, complaints from third parties and so on.

Use of its products for life supporting applications is not one recommended by ALPHA because it is possible, and reasonable to foresee that an anomaly or malfunction of the product can cause an anomaly in the life support device or significantly compromise its reliability and effectiveness.

ALPHA does not recommend using its products for the direct care of a sick person and does not supply its equipment for use in any such application unless it receives written confirmation that the risks of possible injury or harm have been minimised and that the customer has assessed all the risks and takes full responsibility for all related consequences.

The UPS can contain batteries that must be recharged for a minimum of 24 hours every 6 months to avoid being completely flat. Batteries that are completely flat for any reason are not covered by the warranty.

1.7.2 Extension of warranty and maintenance contract

The standard warranty can be consolidated in order to protect the UPS with a guarantee extension contract (maintenance contract). For more details please call the ALPHA assistance Centre.

When the warranty period is up it is possible to join a technical assistance program by means of a subscription of an extension contract that offers an optimum UPS maintenance service.

1.8 Copyright

The information in this manual must not be disclosed to third parties. Any duplication, total or partial, not authorised in writing by the Manufacturer, obtained by photostatting, duplicating or any other method, even electronically, violates the copyright conditions and can be persecuted by law.

2. Description

2.1 Technology of Tri Power X33 Mod HP

Congratulations on your purchase of a UPS Tri Power X33 Mod HP product from ALPHA.

Thanks to the UPS Tri Power X33 Mod HP, your critical equipment will be protected by a constant and reliable supply of power.

ALPHA has developed a project that is both innovative and unique, creating Tri Power X33 Mod HP, the UPS with a power range of 10, 15, 20, 30, 40, 45 and 60 kVA capable of adapting itself at any time to the changing requirements of protected loads: greater power, longer autonomy, redundancy. The basic concepts of the Tri Power X33 Mod HP project are modularity, expandability and redundancy which, beside offering maximum reliability, are also the guarantee of a considerable economic saving.

Tri Power X33 Mod HP is a modular UPS with individually programmable basic modules to allow the input/output configuration required. In this way it is possible to control three and single phase voltage at the input and output to provide three/single, single/three and single/single lines but it is not limited to just this: you can also have up to three independent single-phase output that can be of different powers different powers (on request). In addition to this, for each configuration, it is possible to obtain both complete and partial redundancy.

A microcontroller mounted in each basic module is capable of monitoring the main functions of each single power unit, monitoring its correct operation and signalling any malfunctions.

The modularity philosophy has also been used for the batteries which are supplied in single pull-out boxes.

THDi = 3% - Power Factor > 0.99 – High Yield – High Reliability – Easy to install and service

2.2 Features

Redundant modular architecture

Redundant modular architecture is the best way to protect a company's critical points.

Advantages:

- There is just one control of the devices powered
- Modular expandability
- Module redundancy
- Easy to service
- Low running cost
- Compact size

Yield

The UPS units of the Tri Power X33 Mod HP line place particular attention on the energy taken from the mains and that supplied to the user points. High Yield (>94%), PFC in Input >0.99, THDi 3%.

Advantages:

- Increasing the yield means reducing the part of power absorbed by the UPS but not supplied at the load and transmitted to the environment in the form of heat.
- Less heat dispersed in the environment means reducing the use of aerating or conditioning systems on the installation premises.
- PFC in input means no rephasing costs and consequently no increased rates.
- No need to oversize a generator (if used) upstream from the UPS.

Expandability

The majority of UPS units on the market are neither modular nor expandable and therefore initial oversizing of the system is necessary to ensure future expansions (which might not even happen).

Advantages:

- The modular and expandable Tri Power X33 Mod HP systems allow optimisation of the investments made in UPS units, adapting them to actual requirements without preventing future expansions and avoiding an unnecessary waste of energy.
- System yield is increased thanks to correct sizing.

2. Description

Reliability

To have a redundancy level with traditional UPS units it is necessary to put at least 2 in parallel, thus doubling the power bought, the space taken up and the electricity consumed. Instead Tri Power X33 Mod HP's modular architecture allows redundant configurations inside just one single cabinet.

Advantages:

- A UPS with a modular redundant architecture can be configured as an N+X system redundant in power; even in the case of a failing module the equipment carries on working and there is no break in supply.
- Clear indications and a large Control Panel speed up troubleshooting.
- The modular architecture makes short work of repairing a failure by simply replacing the module in question without interrupting service.
- A high percentage resolution of failures at the first intervention.

Power module

The basic module, available in three power sizes, 3,400 VA, 5,000 VA and 6,700VA, is basically made up of the following functional blocks: command and control logic (microprocessor controlled), rectifier/PFCr, inverter, booster, battery charger, automatic bypass.

The power unit is of Plug & Play type to facilitate power expansion and all maintenance works. Each module is paralleled with other identical ones until the UPS power is reached.

The power modules are separate from each other and will continue to work even if one malfunctions. An LED on the front of the module, with a traffic-light code, quickly shows the operating state of the electronic unit.

The Power module PM4, PM6 and PM7 is only for running in the designed cabinets: Each cabinet of UPS TRI POWER X33 MOD HP is designed for a specific rated power. Power modules are only be changed against the same delivered rated power.

Each cabinet should be equipped only with the Power modules written in the Tab. "Mechanical Data" on page 15 described inside this manual. It is possible to use other Power modules as given and to mix the different power ratings. Never it is allowed to use Power modules to increase the rated power of the cabinet without getting the acceptance from the manufacturer.

- Modell, rated power and types of accepted Power modules are described inside the user manual and on the ID Plate inside the front door of the cabinet.
- Type and rated power of the Power module are on the sticker on front of the module.

Please ensure only to use Power modules which are designed for the UPS TRI POWER X33 MOD HP only.

Battery modules

The battery modules are designed for easy insertion in the cabinet with no work needed to connect them; they are easy to handle thanks to their light weight, likewise for any maintenance or replacing.

A box holds 5 x 12V 7.2 Ah or 9 Ah batteries connected in series and, thanks to the Plug & Play connection can be easily inserted in to, and withdrawn from the cabinet. In order to guarantee maximum safety, especially during maintenance, the voltage of each box is adequately divided into two 24 and 36V branches and restored only when the box is placed right inside its housing.

This conforms to the CEI-EN 60950 standard on electrical safety which establishes that adequate safeguards must be used and particular attention where there are dangerous voltages higher than 50 Vdc with the possibility of direct contact. Autonomy can be increased further still by adding other battery 'boxes' in multiples of four, exploiting the space inside the UPS and the space in the additional 'modular cabinets'.

Digital display and displaying alarms

Tri Power X33 Mod HP is controlled by a microprocessor and has a backlit alphanumeric liquid crystal display (LCD) with 20 characters on 4 lines built into the front of the UPS, where there is also a highly luminous operating status indicator which, by means of a traffic-light code, indicates the operating status and any alarm conditions.

Four simple push buttons near the display allow the user to: see operating data, set operating parameters, analyse the state of each single power module, select the language in which to see the messages and execute a set of functional tests.

Tri Power X33 Mod HP

Battery charger module (BCM)

The BCM works together with the existing battery charger sections of the installed Power modules. If BCMs are mounted additionally has no effect to the existing charging system; only the charging current increase. Each BCM increase the charging current of the system by 15A. The charging current of each BCM is 6 times of the charging current of a Power module.

Putting additional BCM inside the system will reduce the charging time for big battery capacities or make it simply possible to work together with big battery systems. Often an additional BCM is the only way to charge the battery system in an optimal way. During mains available the charging current is taken additionally from the input mains at 230VAC single phase. If the BCM is installed the slot correlation as follows: (left slot - Phase L1, middle slot - Phase L2, right slot - Phase L3).

Any number of BCMs can be installed inside one UPS, minimum 1 Power module has to be installed inside the cabinet. A front LED give informations about the BCM status as well as through the display of the UPS TRI POWER X33 MOD HP. The module is controlled by a microprocessor to verify correct power flow and reliability. We recommend to use BCM with battery capacities bigger 60Ah.

Input voltage 230Vac +15% -20%, Rated Power 4kW, Nominal charging current 15Adc (Maximum), Voltage at time fixed float charge stage 13.75 Vdc/Battery block.

The multicolor LED on the front indicate easily the status of the BCM. All fans are continuously speed controlled; speed-depending on charging power.

The intelligent 4-Phase charging cycle process optimise batteries lifetime (Boost charge with constant current, finished by charging with constant voltage, time limited float charge and Stand-by cycle).

Off-Line-Mode

UPS TRI POWER X33 MOD HP is designed to run in Off-Line-Mode. This is the most energy efficient mode with having the connected load supplied during mains fault.

During Off-Line-Mode the load is directly supplied by the mains through the automatic bypass section integrated in each Power module if mains is available).

In this case the output voltage and the frequency are depending on the mains which supplying the UPS TRI POWER X33 MOD HP. The UPS is not able to control or to filter the voltage to the load. The advantage is the higher efficiency, because the UPS is not working in line with the load and working without load.

In event the output voltage is outside $\pm 15\%$ of the rated voltage or the mains is not available the UPS transfer the load to the inverter section and the load will be supplied from the batteries.

The autonomy time is depending by active power consumption of the load and the battery capacity.

If the mains is back inside limits the load will be transferred back to mains and the UPS change automatically back to Off-Line-Mode.

In operation or in Service Mode it is possible to change between On-Line and Off-Line Mode any time.

- To activate the Off-Line-Mode please follow Setup UPS -> Bypass -> Off-Line-Mode. Enable your choice by pressing the ENTER key.
- To activate the On-Line-Mode please follow Setup UPS -> Bypass -> On-Line-Mode. Enable your choice by pressing the ENTER key.

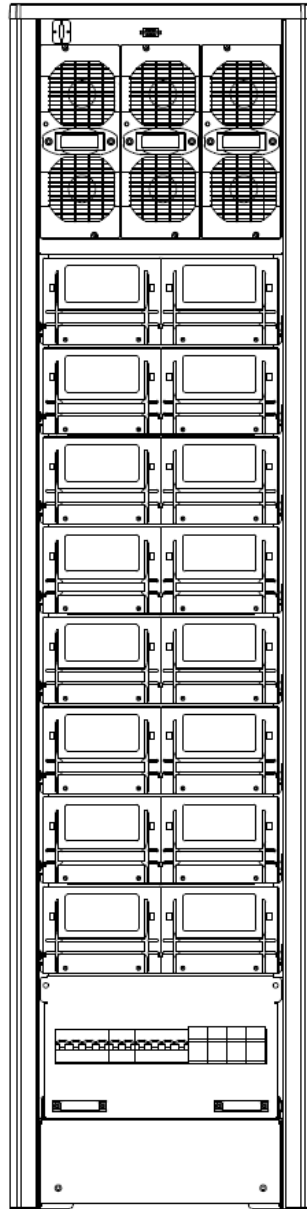


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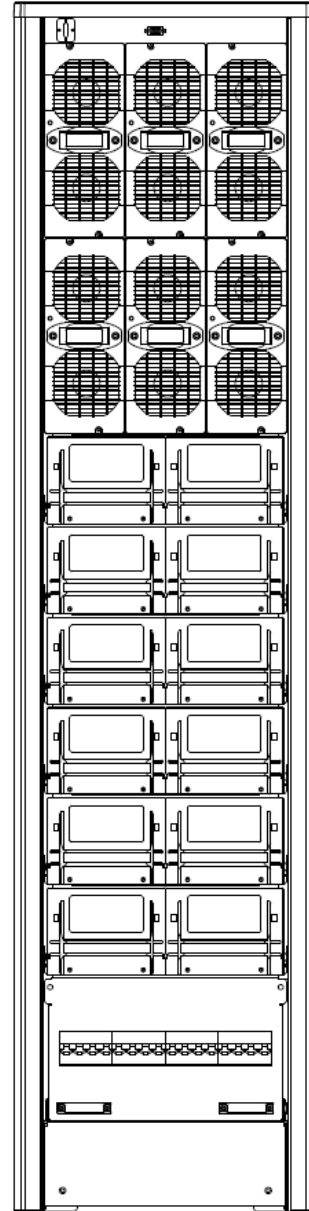
If the load supply should be absolutely uninterruptible with high quality on voltage and frequency the UPS TRI POWER X33 MOD HP has to operate in On-Line-Mode double conversion.

2. Description

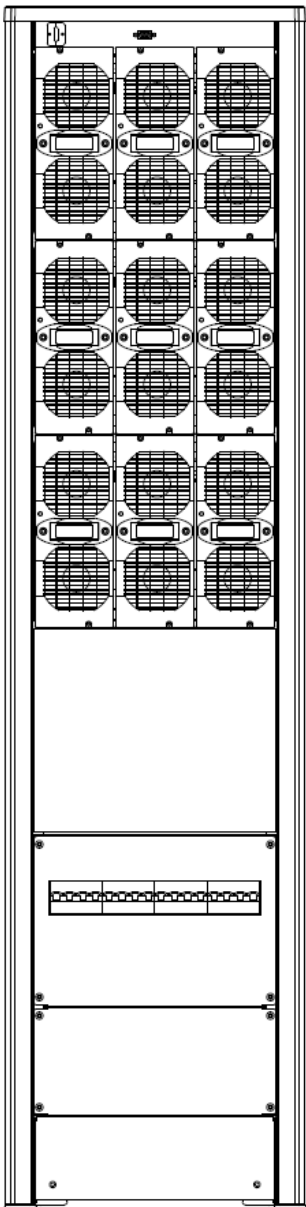
2.3 Models and technical data



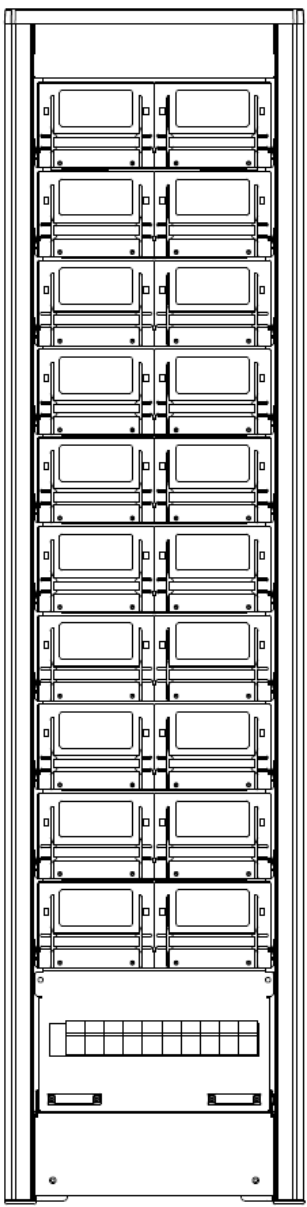
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**USV TRI POWER X33 MOD HP
30**



**USV TRI POWER X33 MOD HP
40/45/60**



**TRI POWER X33 MOD HP
BATTERY**

Main Information

	10	15	20	30	40	45	60
Rated Power	10kVA	15kVA	20kVA	30kVA	40kVA	45kVA	60kVA
Active Power	9kW	13,5kW	18kW	27kW	36kW	40,5kW	54kW
technology	On-Line Dauerwandler Klasse 1 (in Übereinstimmung mit EN62040-3) VFI-SS-111						
IN/OUT configuration	3ph/3ph, 1ph/1ph , 1ph/3ph, 3ph/1ph(konfigurierbar)			3ph/3ph			
UPS configuration	Modular mit Leistungsmodulen 3400VA - 5000VA - 6700VA (PF0,9) in einem einzigen Gehäuse. Skalierbar, redundant N+X						

Input

	10	15	20	30	40	45	60
max. Current (3-phase/3-phase)	18,5 A	27,8 A	37 A	55,5 A	74A	84 A	111 A
max. Current (3-phase/1-phase)	18,5 A	27,8 A	37 A	-	-	-	-
max. Current (1-phase/3-phase)	55,5 A	83,3 A	111 A	-	-	-	-
max. Current (1-phase/1-phase)	55,5 A	83,3 A	111 A	-	-	-	-
Input voltage range	230 V +15% up to -20% (1-phase) 400 V +15% up to -20% (3-phase) (Neutral line is essential)			400 V +15% bis -20% (3-phase) (Neutral line is essential)			
Input frequency	50 Hz / 60 Hz ± 2%						
THD input current	< 3%						
Power factor	> 0,99						

Output

	10	15	20	30	40	45	60			
max. Current (3-phase/3-phase)	14,5 A	21,7 A	29 A	43,5 A	58A	65 A	87 A			
max. Current (3-phase/1-phase)	43,5 A	65,2 A	87 A	-	-	-	-			
max. Current (1-phase/3-phase)	14,5 A	21,7 A	29 A	-	-	-	-			
max. Current (1-phase/1-phase)	43,5 A	65,2 A	87 A	-	-	-	-			
Output voltage	230 V ±1% (1-phasig) 400 V ±1% (3-phasig)			400 V ±1% (3-phasig)						
Output frequency	50 Hz / 60 Hz synchronised to mains									
Wave shape	Sinus									
Efficiency (AC/AC Online)	94% max.									
Efficiency (AC/AC Offline)	99% Max.									
Tolareted overload	125% for 10min - 150% for 60 Sec									
Crestfaktor	3,5:1									

2. Description

Batteriesystem

	10	15	20	30	40	45	60
Type of battery (Modular battery cabinet)	maintenance free sealed lead acid AGM 12V 7,2 Ah or 12V 9 Ah						
Type of battery (Standard single block)	maintenance free sealed lead acid AGM 120 Cells						
KB (Kit Battery) battery string	depend on 4 battery modules (each 5 battery block in row)						

Accessories

	10	15	20	30	40	45	60
Bypass	Automatic (static and electromechanical) Manuel (for maintenance)						
Display and Signals/Alarms	Large alpha-numeric display with 4 lines, multicolored indicator, buzzer						
Communication ports	Two RS 232 ports, 1 relay interface, 1 contact port						
Protections	Electronic against overloads, short-circuits and excessive battery discharge, Functions blocks if autonomy ends. Power surge limiter. E.P.O. contact (total shutdown in an emergency), auxiliary contact for connecting optional external bypass and backfeed Protection unit.						

Mechanical Data

	10	15	20	30	40	45	60
Net weight UPS without batteries (kg)	110 kg			130 kg	154 kg		
Dimensions B x T x H (mm)	414 x 628 x 1367						
No. Power modules 3400VA	3						
No. Power modules 5000VA		3		6		9	
No. Power modules 6700VA			3		6		9
Net weight Power module	8 kg						
Net weight Battery module	14 kg						

Enviromental Conditions

	10	15	20	30	40	45	60
Operating temperature	0° - 40° C						
Relative humidity	20% - 80% non-condensing						
Noise level at 1m	58 - 62 dBA						
Grade of protection	IP 21						

Technical specification battery charger module

INPUT	
Input voltage range	230Vac +15% - 20%
max. Input current	19,3 A
Power factor	> 0.99
THD input current	THDi < 3%

OUTPUT	
Float charge voltage	13,75Vdc / battery block 12V
max. charging current	15 Adc
Efficiency AC/DC	> 93% at maximum charging current

DESCRIPTION	
Multicolor LED indicator on front or information through UPS display	yellow LED fast flashing: Boost charge phase f1 with constant current green LED slow flashing: Charging phase f2 with constant voltage or float charge green LED on: Battery system in standby (no charging) red LED on: Fault

ENVIROMANTAL CONDITIONS	
Operation temperature	0° - 40° C
Relative humidity	20% - 80% non-condensing
Noise level at 1m	42 - 46 dBA
Grade of protection	IP 20 (IEC 529)

STANDARDS FULLFILLED	
EN62040-1, EN62040-2, EN62040-3	

2.4 Communication devices

The uninterrupted power supplies of the UPS Tri Power X33 Mod HP family have 2 RS 232 serial ports, 1 relay interface and 1 output on a 15-pin male D connector logic level interface.



ATTENTION

For security reasons the following voltages are tolerated by the interface:

- Maximum voltage between 2 individual cables, which are connected to the interface or between a cable and ground must be below 42V at peak or below 60Vdc;
- The isolation voltage of connected cables to the interface should be 1500Vac.

2.4.1 RS232

The first of the two RS232 serial ports used on the uninterrupted power supply unit and called „maintenance interface“ is located at the top behind the front door. It is dedicated exclusively to diagnostic functions and updating machine firmware.

The second, called „user interface“, is at the top at the back of the UPS. Using this port, with either a computer or specific network card, it is possible to access UPS operating data and to control the unattended shutdown of the operating system.

2.4.2 Relay interface/EPO

The default setting of the relay interface contacts is Normally Open (NO) but can be configured as Normally Closed (NC) via the UPS display. Additionally there is available an E.P.O. input terminals.

The indications available with this interface are the following:

- Running on battery
- Autonomy reserve
- Generic alarm
- Overload
- Bypass activ

Limit values Interface/Features

The technical specifications of the relay contacts are the following:

$V_{MAX} = 250VAC - 30VDC$, $I_{MAX} = 5A$

E.P.O.-Input

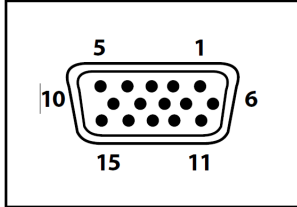
Voltage on open contact: 12V, current with closed contact: 5mA

For contact numbering (factory setting)

G	PIN	FUNKTION
	1-2	Running on battery
	3-4	Autonomy reserve
	5-6	Generic alarm
H	7-8	Overload
H	PIN	FUNKTION
	1-2	Bypass activ
	3-4	E.P.O.
H	5-6	-

2. Description

2.4.3 Logic level interface



Logic level interface is available on the male DB15 connector; it is used to connect the UPS to a remote system for monitoring its operating status. The following indications are available with it:

- Mains/battery run
- Autonomy reserve
- UPS failure
- Overload
- Bypass activ

The functions of the interface pins are:

Pin 1: GND;
Pin 2: Mains-/Battery run (Open Collector - activ high);
Pin 3: Autonomy reserve (Open Collector - activ high);
Pin 4: RS232 Voltage;
Pin 6: no connection
Pin 7: Overload (Open Collector - activ low)
Pin 12: Mains-/Battery run (Open Collector - activ low);
Pin 13: Bypass activ(Open Collector - activ low)
Pin 14: Autonomy reserve (Open Collector - activ low);
Pin 15: UPS failure (Open Collector - activ low).

Electrical characteristic

Logic output: 12V_{DC} max., Output impedance 2,2kΩ.

RS232 Voltage: 12V_{DC} 700mA max.

Open Collector Output (all): 30V_{DC}, 100mA max.

2.4.4 Communication Slot SNMP

On the rear of UPS Tri Power X33 Mod HP an SNMP Slot is available for SNMP Adapter (Optional)



ATTENTION

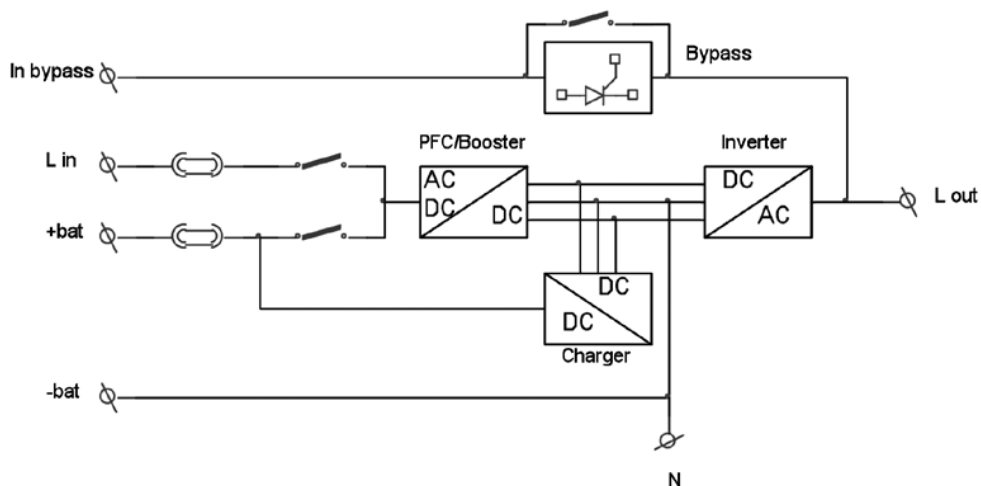
The summary current through Pin 4 of the logic interface DB15 and the supply current for the network card should not exceed maximum 700mA.

2.4.5 Input external bypass switch auxiliary contact

This input is located on the AC terminal (A.R.B.C.). It is possible to connect a auxiliary contact of an external bypass switch. If the contact is closed the UPS get the signal that the external bypass switch is closed. At the same time the UPS activate the internal automatic bypass to protect the inverter.

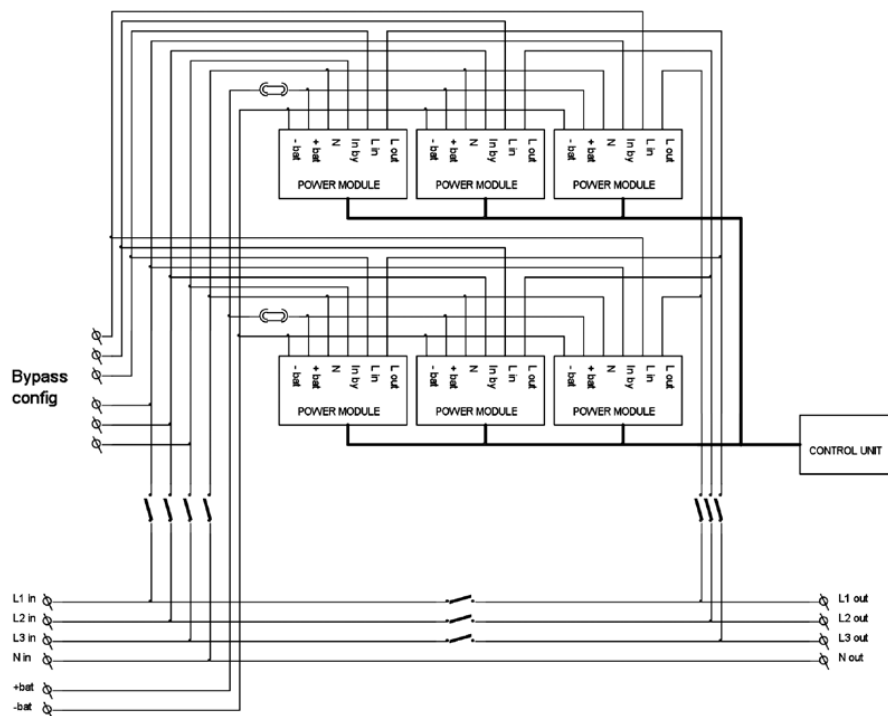
Tri Power X33 Mod HP

2.4.6 Block diagramm power module



2.4.7 Circuit diagram 30kVA TRI POWER X33 MOD HP

The circuit for other modelks are similar.



3. Safety instructions

3.1 General notes



WARNING

Before undertaking any operation on the equipment, it is necessary to read through the whole manual carefully, paying attention to this chapter in particular.

The equipment has been built for the application specified in the declaration of conformity enclosed with this manual.

Under no circumstances is it allowed to use it for purposes other than those for which it has been designed, nor in ways different to those detailed in the manual.

The various operations and interventions must be carried out following the criteria and chronology described in this manual.

3.2 Symbols

In this manual some operations are highlighted by graphical symbols that call the attention of the reader to the danger involved in the operations. The graphics are as follows:



WARNING

This means the possibility of an event happening that could lead to serious injury or great damage to the equipment if adequate precautions are not taken.



ATTENTION

This means the possibility of an event happening that could lead to slight injury or material damage if adequate precautions are not taken.

INDICATION

This means important information that must be read paying maximum attention.

3.3 Definitions of „Operator“ and „Specialized Technician“

The professional figure that is going to access the equipment for normal use is defined by the term „operator“.

With this definition it is meant personnel who know how to use and service the equipment and have undergone the following:

- specific training that authorises them to work according to the safety standards in relation to the dangers that the presence of electricity can bring about.
- training on how to use the Individual Protective Devices and on the basic first aid interventions.

When the company person in charge of safety chooses the operator who is to use the equipment – who must be suitable for work in accordance with the existing laws – he must consider the physical aspect (no impairment), the psychological aspect (mental equilibrium, sense of responsibility) and personal education, training, experience and knowledge of the standards, prescriptions and provisions for the prevention of accidents.

Based on the skill and capacity found, he shall also oversee the operator's training in order to give him full knowledge of the equipment and its component parts.

To conclude, the operator must be made aware of the contents of this manual.

3.3.1 Qualification required to the operator

The operator must follow the instructions given to ensure maximum safety for himself and for the others. **In particular he must comply with all the requirements contained in this manual throughout all the operating phases.**

Typical activities envisaged:

- using the equipment when it is working normally and resetting subsequent to a stop;
- taking the necessary measures to maintain performance quality;
- cleaning the equipment
- collaborating with personnel who are to see to extraordinary maintenance work ('specialized technician').

3.3.2 Qualification required to the specialized technician

The professional person who has to look after installation, starting and extraordinary maintenance is defined by the term „specialized technician“.

With such a definition we mean people with knowledge of the procedures for installing, assembling, repairing and servicing the equipment and who have specific technical qualification. Besides the requirements listed for a generic operator, the specialized technician must have had technical training or specific training for the procedures needed to use and service the equipment in complete safety.

Broadly speaking, the specialized technician will be a person selected among the professional people in the department and who has proven experience and capacities and specific technical expertise in relation to the type of work to be done.



WARNING

The person in charge of safety is responsible for the protection against and prevention of company risks in accordance with the European Directive 89/391 EEC (safety at the work place). The person in charge of safety must ensure that all people working on the equipment have received all the relevant instructions of this manual, included start-up and commissioning, and with particular reference to the contents of this chapter.

3.4 Personal protective gear



WARNING

There is a high risk of electrical shock with the equipment as well as a considerable short circuit current. When using and servicing the equipment it is absolutely forbidden to work without the protective gear mentioned in this paragraph.

The personnel who are going to work and/or transit near the equipment must not wear clothes with baggy sleeves or laces, belts, bracelets or other metal items that could be a hazard source.

3.4.1 Gear to wear

The following indications summarise the protective gear to wear:



Accident and spark proof footwear with rubber sole and reinforced toe

Use: always



Waterproof rubber gloves

Use: always



Protective gear

Use: always



Protective glasses

Use: always

3. Safety instructions

3.5 Indications of danger in the work place

The following signs must be placed in all points of access to the premises where the equipment is installed:



Electric current

It indicates the presence of live parts.



Emergency interventions

Do not use water to extinguish a fire but only the extinguishers designed specifically for putting fires out on electronic equipment.



No smoking

This indication explains that it is forbidden to smoke in the area where the sign is affixed.

3.5.1 Indications on board the equipment

The explanatory plates on the equipment can vary according to the country of destination and to the relative applicable construction laws.

Strictly comply with what is required. It is strictly forbidden to remove these plates or to work in a way different from what is indicated on them.

All the data on the plates must always be readable and cleaned periodically.

If a plate is ruined and/or is no longer legible, even only in part, ask for a new one from the Manufacturer who is bound to supply a substitute.



WARNING

The plates must be neither removed nor covered; it is forbidden to affix others on the equipment without the prior written authorisation from the manufacturer.

3.6 Residual risk

„Residual“ risks are risks that were impossible to eliminate at the design phase and, as such, are potentially present on the equipment.

These risks are found with a specific analysis as prescribed by the standards of the sector. The documentation relative to the analysis is included in the Technical File of the machine filed by the Manufacturer.

In the case of the UPS Tri Power X33 Mod HP there are no residual risks provided that all the indications and provisions in this manual are scrupulously complied with.



WARNING

The risk can be drastically reduced by wearing the Personal Protective Gear listed in this chapter, considered indispensable. Always work with due caution when near the dangerous areas indicated by the signs on board the equipment.

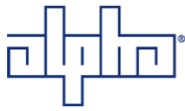
3.7 General warnings



ATTENTION

The equipment generates, uses and can radiate energy and radio frequencies. If not installed and used in agreement with the indications given in this manual, it can interfere with radio communications.

- The equipment must be kept and used in accordance with the instructions given herein and as suggested from time to time.
- The department manager must instruct the operating and maintenance personnel on how to use and service the equipment in complete safety.
- Only specialized and specifically instructed personnel must be allowed to access the equipment for maintenance work. All the time such maintenance work is being done, '**Work underway**' signs must be affixed in the department that can be seen from all access points.
- Connection of the equipment (and of any accessory devices) must include standard earthing to discharge short circuit current and electrostatic voltages. Mains voltage must correspond to the value on the ID plate. Use of current adapters is not allowed. When connecting pay attention to polarities.
- Any work on the equipment must be done only after it has been disconnected from the supply mains via the switch which must be padlocked.
- When the equipment is received, or prior to switching on each time, DO NOT switch the UPS on if the batteries are leaking.
- Tools used for maintenance (pliers, screwdrivers, etc.) must be the electrically insulated type.
- It is strictly forbidden to deposit combustible materials near the equipment. It must always be kept locked and access allowed only to specifically trained personnel.
- Do not deactivate the safety devices or ignore the indications, alarms and warnings, whether they are communicated automatically or by means of plates on the installation.
- Do not turn the machine on without the fixed protections in place (panels, etc.).
- In the case of breakages, deformation or malfunctions of the equipment or parts of it, repair or replace immediately, avoiding 'emergency' repairs.
- It is not allowed to modify, manipulate or in any way alter the structure of the equipment, the devices mounted on it, operating sequence, etc., without having first consulted the Manufacturer.
- If the fuses have to be changed, always and only use ones of the same type.
- Changing the batteries is a job for a specialized technician. Bear in mind that the electrolyte can cause irreparable injury to skin, mucous membranes, and eyes and is toxic if inhaled or swallowed. Always work with the most suitable Individual Protective Gear. Do not forget that the batteries must be disposed of according to the laws existing in the country where the equipment is installed as they are toxic waste. **Under no circumstances can a battery be burnt as it would cause an explosion!**
- All maintenance work, routine and extraordinary, must be recorded in a register, noting the date, time, type of job, name of the operator and all useful information. If necessary use the pages added at the end of the „Maintenance“ chapter.
- Do not use oils or chemicals to clean with, as they can corrode or damage parts of the equipment.
- Both the equipment and the work place must be kept clean.
- When maintenance is finished check carefully that no tools and/or materials have been left near the equipment before turning the electricity back on.



3. Safety instructions

3.8 Emergency interventions

The following information is of a general nature. For specific interventions please consult the laws existing in the country where the equipment is installed.

3.8.1 First aid interventions

If any first aid intervention is required, comply with company rules and traditional procedures.

3.8.2 Fire prevention measures

Do not use water to extinguish fire but only the extinguishers designed specifically for putting fires out on electronic equipment.

4. Unpacking and assembly

4.1 Visual inspection

When the UPS is delivered, examine the packaging and product carefully to see if any damage was done during transport. In particular check the integrity of the indicator on the external 'Shock Watch' label.

If either possible or ascertained damage is found report it immediately to:

- the carrier;
- the ALPHA Assistance Centre.

Make sure that the unit received corresponds to the material specified on the delivery document.

The UPS Tri Power X33 Mod HP packaging protects the equipment against mechanical and environmental damages.

For greater protection it is also wrapped in a transparent film.

4.1.1 Checking the equipment and accessories supplied

The equipment and relevant accessories supplied (as agreed with the manufacturer) must be in perfect condition.

Before it is shipped the equipment is checked carefully; however, it is always advisable to check it is complete and in order when receiving it.

Make sure that:

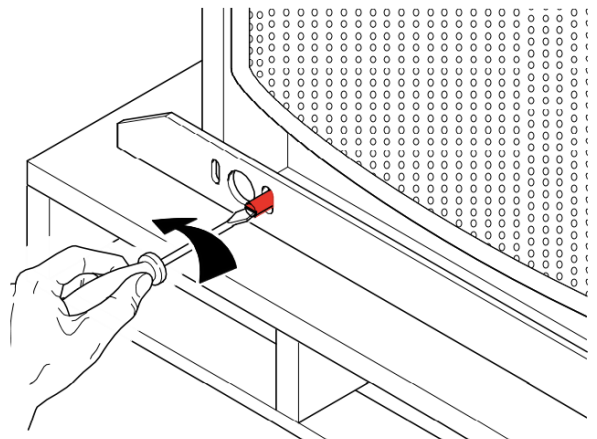
- The shipping data (consignee's address, number of packs, order number, etc.) are the same as those written on the accompanying documents;
- The technical-legal documentation that comes with the equipment includes the user manual for the specific type of UPS to install together with the CE Declaration of Conformity.

In the case of defects and/or material missing, send a report immediately to the Manufacturer and wait for instruction before commissioning the equipment.

4.2 Unpacking

When removing the packing material observe the 'ARROW' on the outside box. To remove the UPS from the packaging follow these steps:

1. cut the wrapping and open the plastic safety straps;
2. open the top of the cardboard box;
3. remove the top protection;
4. remove the four corner protections;
5. remove the packaging container, pulling it upwards;
6. remove the pallet and front/rear bracket from the UPS, loosening the 4 securing screws;
7. inspect the UPS to see if it has been damaged in any way. Notify the carrier and supplier immediately if any apparent damage is found.



Keep the packaging material in case the UPS has to be shipped in the future. The packaging materials are 100% recyclable; if you want to dispose of them please comply with the existing laws.

4. Unpacking and assembly

4.3 Checking the contents of the pack

Below is a list of the materials supplied. The list is general. Please refer to the packing list for shipment details.

TRI POWER X33 MOD HP INVERTER

- Qty.1 Cabinet TRI POWER X33 MOD HP UPS;
- Qty. 1 bag of accessories with set of screws for installing the unit correctly;
- Qty.1 front closing panel;
- Qty.2 base strips for side closing;
- Qty. 1 Operating and maintenance manual;
- Qty. 1 International guarantee.

TRI POWER X33 MOD HP BATTERY

- Qty. 1 Cabinet TRI POWER X33 MOD HP BATTERY;
- Qty. 1 Operating and maintenance manual;
- Qty. 1 multicore cable for connecting to the UPS TRI POWER X33 MOD HP;
- Qty. 1 bag containing fuses and keys for the front door.

Check that the UPS Tri Power X33 Mod HP technical data on the plate affixed on the inside panel of the door, inside the hatch of the UPS, correspond to the material bought and described on the delivery document.

4.4 Storing

4.4.1 UPS

If the UPS is going to be stored prior to installation, regardless of whether or not it is still packed, it must be on dry, clean and fresh premises where the ambient temperature is between 0°C and +50°C (32-122°F) and with humidity below 90% (not condensing).

4.4.2 Batteries

The standard batteries of the UPS Tri Power X33 Mod HP are sealed lead-acid, they are maintenance-free and installed internally.

Lead is a dangerous substance for the environment if it is not recycled by specialized companies.

If the batteries are not charged they cannot be kept for more than 6 months at 20°C (68°F) or more than 3 months at 30°C (86°F) or more than 2 months at 35°C (95°F).



ATTENTION

Sealed batteries must never be stored if they are partly or totally flat.

To charge the batteries before and after storing, simply connect the input power supply to the UPS, plug in the mains switch and those of the battery (F B+ and F B-) and the bridge in the neutral switch and then close the switches.

When the unit detects the input voltage it automatically proposes starting a battery charging cycle. After about 1 minute charging starts automatically and the time left to finish charging is shown on the display. The charging cycle can be stopped at any time by pressing the 'ESC' key.

If the UPS is delivered without batteries, ALPHA is not liable for any damage or bad operation caused to it by an incorrect wiring of the batteries.

4.5 Handling



ATTENTION

Handle with great care, lifting it only to the extent necessary, keep it well balanced and avoid swinging which could be dangerous.

If it weighs less than 30 kg (check on the transport document) the equipment can be moved around by hand as it has two wheels.

Do not forget that the equipment must always be handled by trained personnel, equipped with the Individual Protective Gear as specified in Chapter 3.

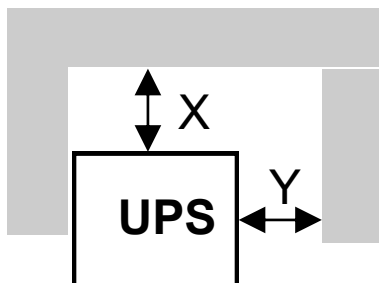
If the equipment needs to be lifted, use a forklift truck or transpallet of a suitable capacity, inserting the forks in the wooden base, making sure they come through on the opposite side by at least twenty centimetres.

4.6 Positioning

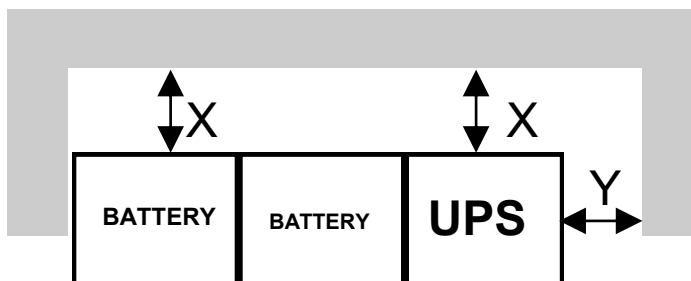
The UPS must be placed observing the following conditions:

- humidity and temperature must be within the prescribed limits;
- the fire protection regulations must be observed;
- wiring must be of easy execution;
- the front and rear must be accessible for assistance or routine maintenance;
- the flow of cooling air must be guaranteed;
- the air conditioned system must be adequately sized
- there must be no corrosive/explosive gases;
- the premises must be free from vibrations;
- the clearance at the back and sides must guarantee adequate circulation of the cooling air.

Minimum clearances
recommended UPS
X=100 mm / Y=200 mm



Minimum clearances
recommended UPS +
BATTERY
X=100 mm / Y=200 mm



INDICATION

Bear in mind that the average life of the batteries is strongly influenced by the environmental operating temperature. Place the unit on premises where the temperature ranges between +18°C (64.4°F) and +23°C (73.4°F) which will guarantee a very long battery life.

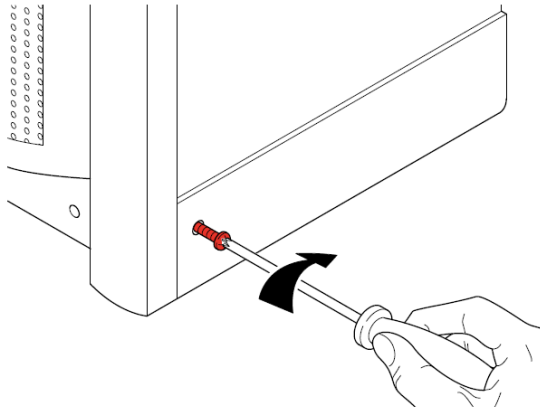
4. Unpacking and assembling

Before commencing installation, make sure there is enough lighting on the equipment so that each single detail can be seen easily. Use artificial lighting if natural lighting is not enough for the aforementioned requirements.

If maintenance work has to be done on parts that are insufficiently illuminated, it is compulsory to use portable lighting, being careful not to create shadows that will prevent or reduce visibility on the point you are working on or on the surrounding areas.

4.7 Last operations

Once positioned correctly, fit the two side base strips and the front one supplied in the accessory kit.



5. Installation



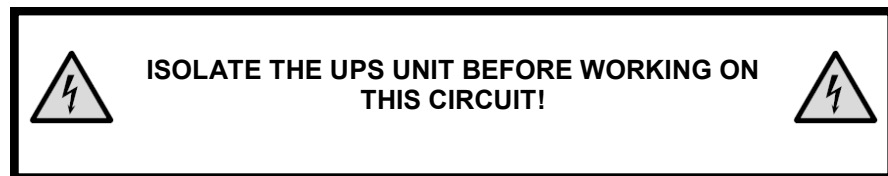
WARNING

The instructions in this chapter are not addressed to a normal operator but to a specialized technician, authorised to work only if he uses the Personal Protective Gear mentioned in Chapter 3.

5.1 Safety rules and regulations

Before starting installation please read and apply the following:

1. It is necessary to ensure that the distribution panel, to which the UPS is going to be connected, has a proper connection to the earth circuit and adequate protection, as required by law.
2. Only the fixed type of the UPS Tri Power X33 Mod HP units must be installed with a thermal circuit breaker upstream. Connection of the unit to the mains using a traditional plug is not allowed.
3. The mains supply panel or disconnecting device, must be installed near the equipment and easy to access.
4. Upstream UPS the can be dangerous voltage if unit is switched on. To avoid this a Backfeed Protection Unit has to be installed upstram UPS (follow circuit diagram next page).
5. If there is no Backfeed Protection Unit is installed a warning label must be affixed on all mains supply isolating switches installed far away from the UPS area to remind assistance personnel that the circuit is connected to a UPS. The label must give the following message (or the equivalent):



UPS TRI POWER X33 MOD HP is equipped with an auxiliary contact to activate an extern device of the external Backfeed Protection Unit. This auxiliary contact is a relay with contacts C/NC/NO. The terminal is mounted on the AC connecting terminal on the bottom an is written "BACKFEED PROTECTION".

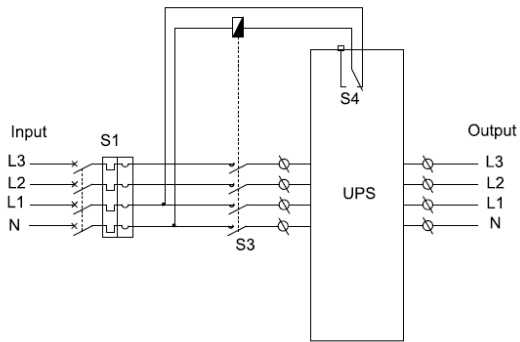
If the UPS detect a backfeed voltage the realy is energised. This gives the extenal device the possibility to disconnect the input lines upstream (Backfeed Protection Unit is an optinal feature and not part of the unit). A possible circuit diagramm is given on the following page.

Technical specification relay contact:

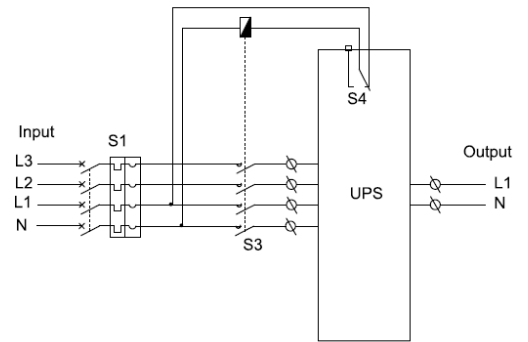
- Maximum voltage: 250 Vac
- Maximum Current: 5A

5. Installation

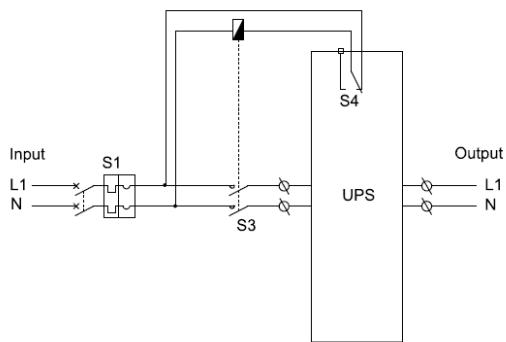
5.1.1 Connection diagram Backfeed Protection TN-Mains



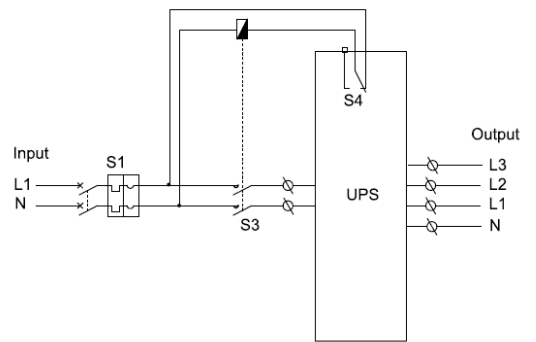
3-phase/3-phase



3-phase/1-phase



1-phase/1-phase



1-phase/3-phase

Agenda:

S1 circuit breaker upstream.

S3 relay to cut mains upstream.

S4 auxilay contact to drive relay.



ATTENTION

If the UPS give signal that the Backfeed Protection is activated, please contact the service.

5.2 Electrical connections

The electrical connection of the UPS to the switchboard is part of the installation and is usually done by the user and not by the UPS manufacturer; therefore the following indications are purely an example and the actual electrical connections must be done in accordance with local standards.

Once the UPS has been removed from the packaging and positioned in its final place of installation, the authorised technician can start the installation.

5.2.1 Safety recommendations



ATTENTION

Before starting please read and apply the following with attention. It is strictly forbidden to proceed with installation if one or more of the following conditions have not been checked.

1. Do not proceed with installation if there is water or moisture.
2. Remember that opening or removing the panels from the UPS you risk exposure to high and dangerous voltages.
3. Check there is no mains voltage on the equipment.
4. Check that the loads are off and disconnected from the UPS;
5. Check that the UPS is off and not live.

All the electrical connection operations are done working on the distribution box. The fuse carriers, output switch and manual bypass switch are on the outside of the box while inside you will find the terminal block on which to do the connections.

5.2.2 Preliminary operations

Before connecting the UPS make sure that:

1. mains voltage (volt V in input) and frequency correspond to the values on the UPS rating plate;
2. earthing complies with the IEC standards (International Electronic Commission) or local regulations;
3. the electrical system is equipped with all the necessary differential protections and thermal circuit breakers upstream from the UPS input.

5.2.3 Connection the load

Before actually starting to connect the loads make sure the rated power of the UPS (OUTPUT POWER) indicated on its rating plate is equivalent to or greater than the total sum of the load powers.

INDICATION

The loads wiring diagram is in the DIAGRAMS chapter.

The characteristics of the output cables must conform to the sections of the cables indicated in table 5 of the TABLES chapter.

A separate switchboard must be supplied for the load. It is a good idea to use isolating switches or thermal circuit breakers conforming to the IEC standards to protect the lines leading from the electrical panel.

Use adhesive labels or similar to indicate the following values on the system's general panel:

- maximum rated power of the total load;
- maximum rated power of the load at power intakes.
- if an ordinary switchboard is used (outlets for mains voltage and for the UPS), make certain that there is an indication of the voltage applied on each outlet ('Mains' or 'UPS').

5. Installation

5.2.4 Emergency Power Off (E.P.O.)

In accordance with the standards, the UPS is fitted with an emergency device that uses a normally closed contact (already installed on the UPS) that can be opened to activate the emergency machine power off. The E.P.O. terminals are on the right of the terminal block inside the distribution box.

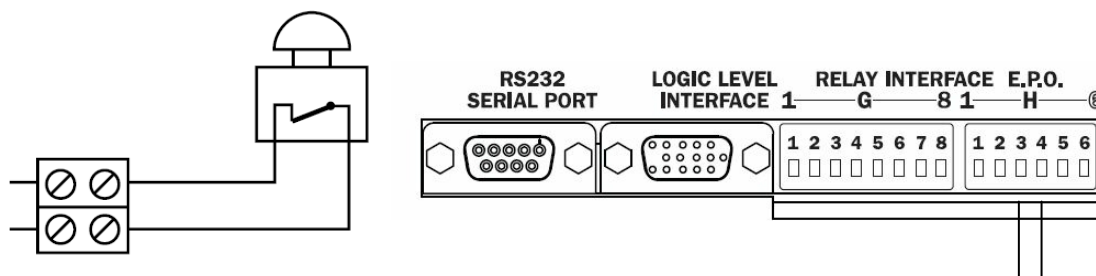
To connect the emergency power off device please follow these instructions:

- use a cable with double insulation;
- connect the cables as shown in the following figure.

Electrical properties of the E.P.O.-Port:

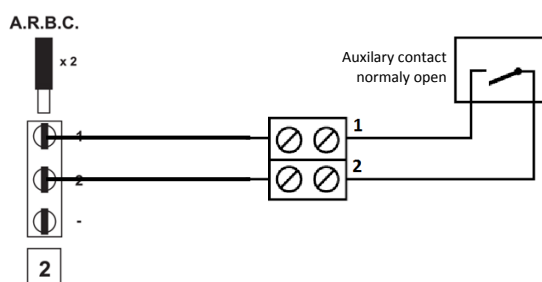
- Voltage between terminal 3 and 4 (Combicon 6P) with open circuit = 12Vdc
- Current between terminal 3 and 4 (Combicon 6P) with closed circuit = 5mA

The following picture indicates the connection of the E.P.O.-Port:



5.2.5 Connection external Bypass auxiliary switch

If an external bypass switch is available the position can be transmitted via an auxiliary contact which has the similar position the main switch. The auxiliary contact can be connected in the following way: As soon the external auxiliary contact is closed between terminal 1 and 2 (A.R.B.C.) the UPS recognizes closed external bypass switch. At the same time the UPS activate the internal automatic bypass to protect the inverter.



5.2.6 Installing the Tri Power X33 Mod HP BATTERY

It is possible to connect external battery units to increase UPS autonomy. If the configuration uses more than one battery it is necessary to position all the Tri Power X33 Mod HP BATTERY units on the same side of the UPS Tri Power X33 Mod HP and connect them in cascade with each other using the multicore cables supplied.

- a Modular Battery Unit consists of a cabinet with an internal structure that uses battery boxes for up to a maximum of 100 12V 7.2Ah or 12V 9Ah batteries (20 boxes).

A Tri Power X33 Mod HP UPS can be connected to several Tri Power X33 Mod HP Battery units.



ATTENTION

The following instructions are of a prescriptive nature and it is imperative they be complied with.

Tri Power X33 Mod HP

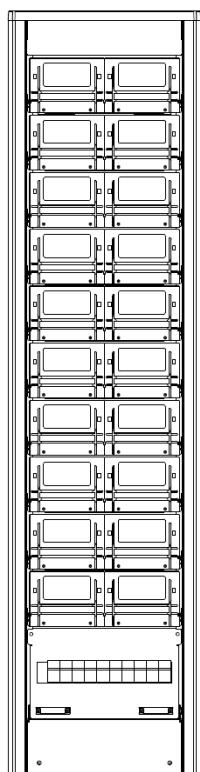
Opening or removing the panels from the UPS Tri Power X33 Mod HP or Tri Power X33 Mod BATTERY risks exposure to high and dangerous voltages! To guarantee protection of personnel during installation of the Tri Power X33 Mod HP BATTERY make sure that the connections are done under the following conditions:

1. there must be no mains voltage
2. the loads are off and disconnected;
3. the UPS Tri Power X33 Mod HP is off with no voltage and all fuse carrier isolating switches on the UPS Tri Power X33 Mod HP and Tri Power X33 Mod HP BATTERY are open.

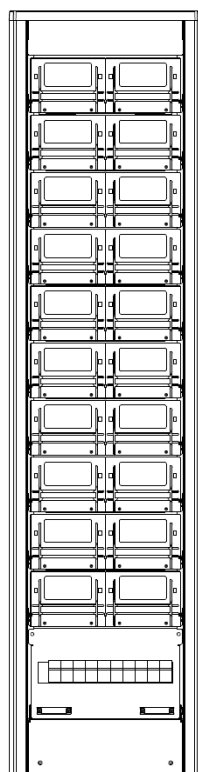
To ensure that the UPS Tri Power Mod has stopped completely if you want to add a Tri Power X33 Mod HP BATTERY in an existing installation, follow the steps illustrated in the MAINTENANCE chapter.

The connection of a Tri Power X33 Mod HP BATTERY to the UPS Tri Power X33 Mod HP must be done according to the following diagram and the steps listed below:

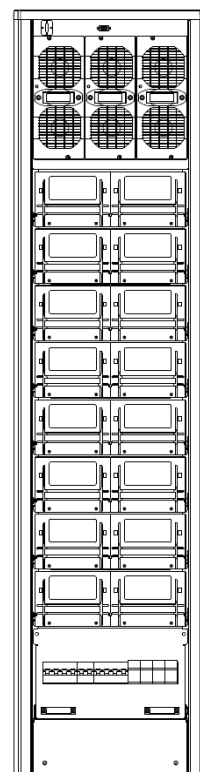
**TRI POWER X33 MOD HP
Batterieschrank**



**TRI POWER X33 MOD HP
Batterieschrank**



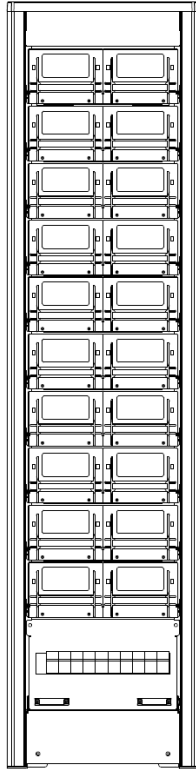
**TRI POWER X33 MOD HP
10/15/20/30**



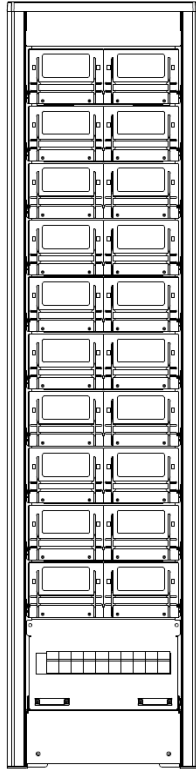
1. make sure that all the battery fuse carrier isolating switches are open;
2. in each Tri Power X33 Mod HP BATTERY remove the lower front panel;
3. In each Tri Power X33 Mod HP BATTERY remove the terminal block loosening the 2 securing screws;

5. Installation

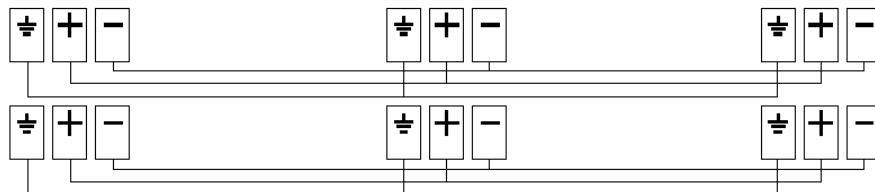
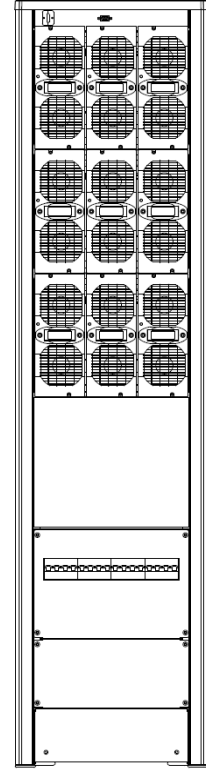
**TRI POWER X33 MOD HP
BATTERY**



**TRI POWER X33 MOD HP
BATTERY**

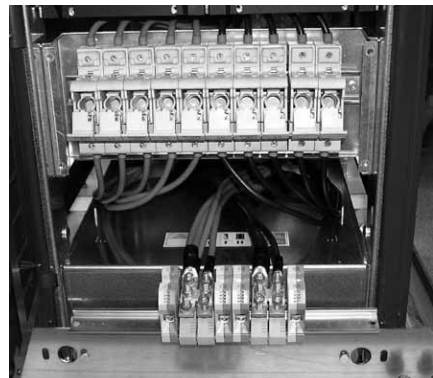
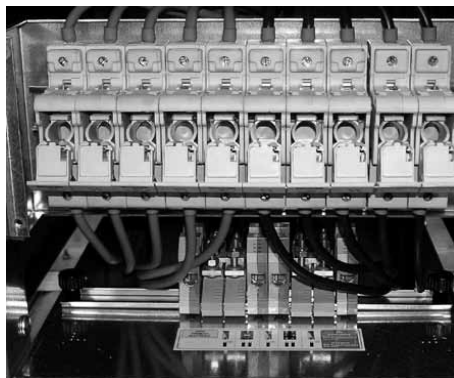


**TRI POWER X33 MOD HP
40/45/60**



The connection of a Tri Power X33 Mod HP BATTERY to the UPS Tri Power X33 Mod HP 60kVA must be done according to the following diagram and the steps listed below:

1. make sure that all the battery fuse carrier isolating switches are open;
2. in each Tri Power X33 Mod HP BATTERY remove the lower front panel;
3. In each Tri Power X33 Mod HP BATTERY remove the terminal block loosening the 2 securing screws;



4. connect the UPS and the additional battery cabinet using the earth cable (yellow-green);
5. use the cables supplied with the Tri Power X33 Mod HP BATTERY to connect the positive and negative terminals of the UPS Tri Power X33 to those of the Tri Power X33 Mod HP BATTERY

Tri Power X33 Mod HP



ATTENTION

The connection of a Tri Power X33 Mod HP BATTERY to the UPS Tri Power X33 Mod HP 40kVA, 45kVA and 60kVA must be done using BOTH cable kits supplied with the Tri Power X33 Mod HP BATTERY

6. in each Tri Power X33 Mod HP BATTERY insert the terminal block securing it with the 2 screws provided;
7. in each Tri Power X33 Mod HP BATTERY secure the lower front panel.

5.2.7 Protection

To ensure correct operation of the UPS and its accessories the electrical system must be adequately protected. Automatic differential switches and thermal circuit breakers are typically used, connected between the mains supply and the UPS with the purpose of providing additional protection in the event of overloads or short circuits.

INDICATION

Chapter 11 gives information about the thermal circuit breakers.

5.2.8 Earthing

Connect the earth wire leading from the low voltage switchboard panel to the EARTH terminal on the UPS terminal block.

INDICATION

The wiring diagrams are given in the DIAGRAMS chapter.

5.2.9 Connecting the power supply

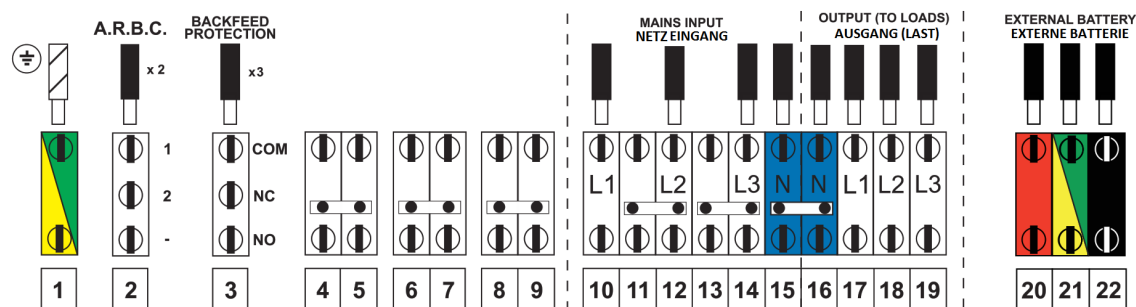
For safety reasons, connection of the power supply must be the last thing to be done.

Before connecting the power supply cables make sure that the maintenance by-pass S1 is open in the OFF position and arrange fuses and jumpers on the terminal block according to the required input-output configuration.

INDICATION

Chapter 11 gives information about sizing cables, fuses, circuit breakers and differentials.

The default configuration for the UPS Tri Power X33 Mod HP units distributed by ALPHA is a THREE-PHASE INPUT and a THREE-PHASE OUTPUT.



If you are using this type of distribution, the fuses and jumpers are already correctly sized and positioned.

For different configurations please consult the following chapter and wiring diagrams in the DIAGRAMS chapter.

Connect the power cable leading from the low voltage switchboard to the UPS terminals as illustrated in the previous figure (or in the wiring diagram for the type of connection used), taking care to observe the cyclic direction of the phases (L1, L2, L3).

5. Installation



WARNING

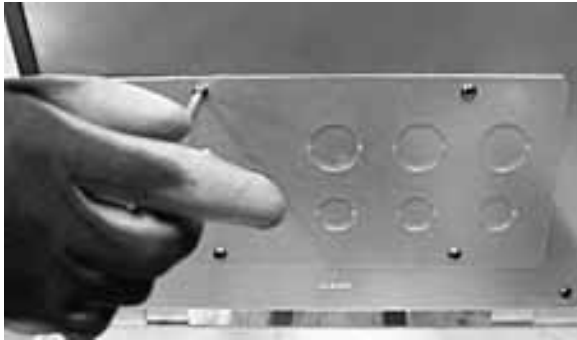
The neutral conductor cable in input must ALWAYS be connected! If the neutral is not connected the UPS could be seriously damaged when powered by the mains.

5.2.10 Cable entry

The UPS has holes in the base for putting cables through if they are coming from underneath.

It also has a pre-punched metal plate at the back arranged for inserting glands of different diameters. The glands are supplied in the accessories kit.

The plate is fixed to the UPS with four screws.



5.3 Wiring diagrams

The electrical configuration can be set up either on the operator panel or on the terminal block of the distribution box, located inside at the bottom of the front door.

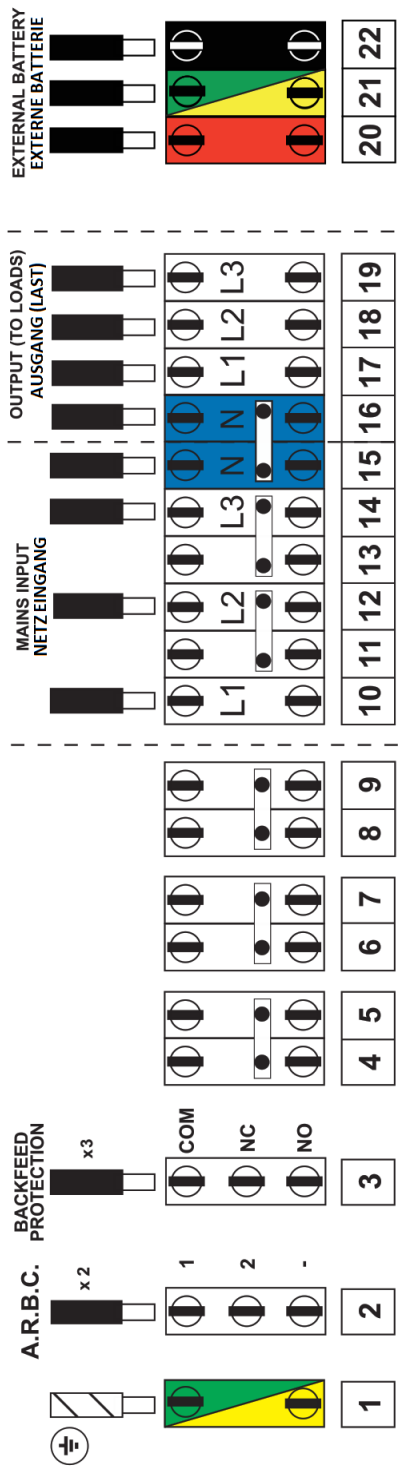
To access the distribution terminal block you have to loosen the box locking screws and pull it outwards.



WARNING

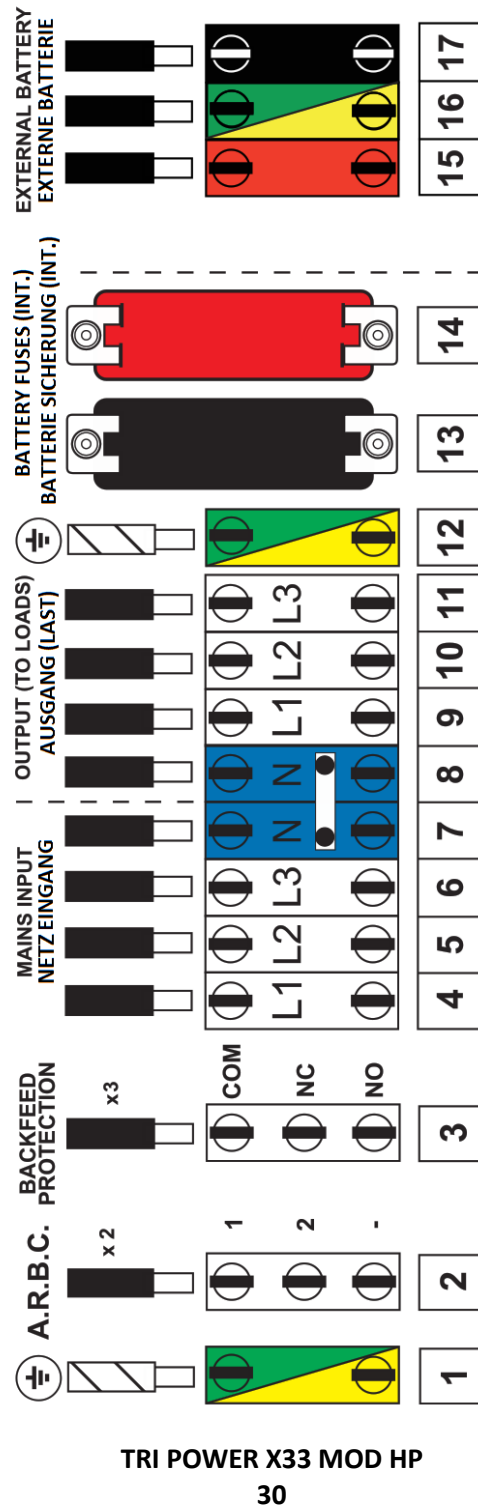
If the factory set configuration is changed (see paragraph 5.2.8) the new configuration must be set correctly via the instrument panel as described in paragraph 6.4.

5.3.1 Factory set configuration: 3-PHASE-Input, 3-PHASE-output



TRI POWER X33 MOD HP
10/15/20

5. Installation



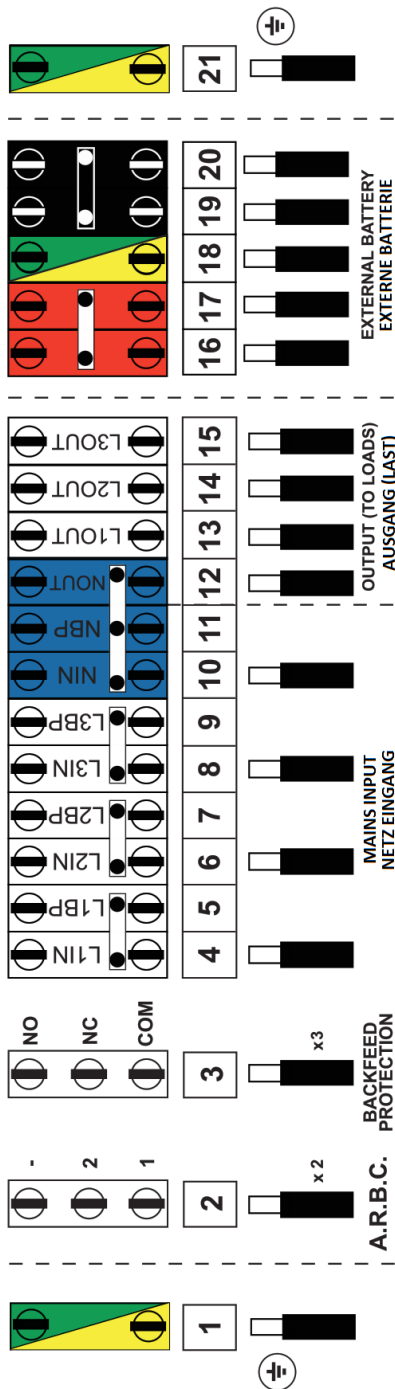
5.3.2 3-PHASE-Input, 3-PHASE-Output 40/45/60kVA

UPS Tri Power X33 Mod HP 40/45/60 are equipped with a separate bypass input connection. Feactory setting the bypass line is linked together with the mains input. If the separate bypass line is used the 3 links L1IN - L1BP, L1IN - L2BP and L3IN - L3BP has to be removed abd then wired separately.

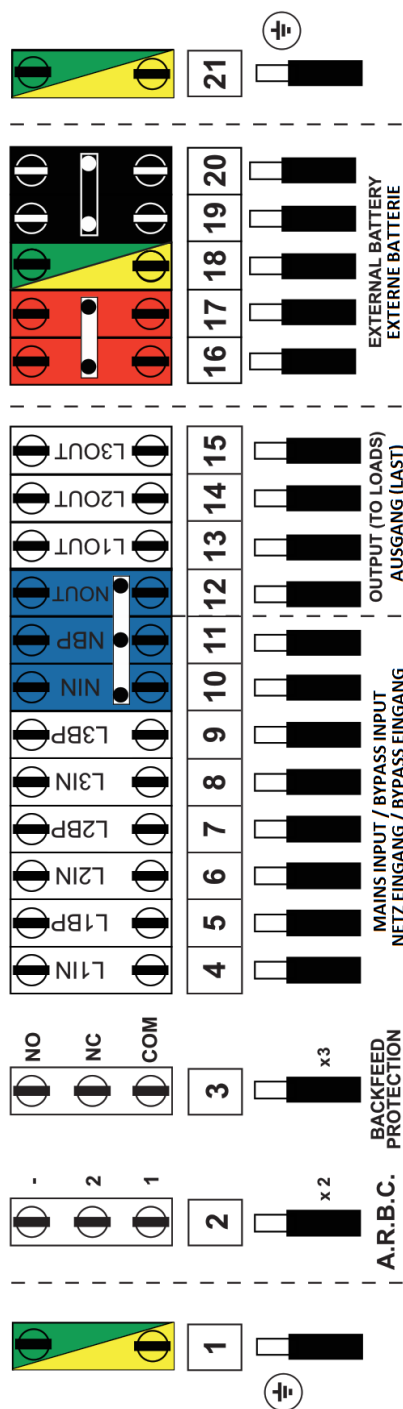


ATTENTION

The bypass line must have the same netral connection as the mains.



TRI POWER X33 MOD HP40/45/60
with single mains



TRI POWER X33 MOD HP40/45/60
with separate bypass

5.3.3 Basic settings single phase output

If the UPS is used with a single phase output the basic configuration has to be changed. The single phase configuration is only available on TRI POWER X33 MOD HP 10/15/20.

first step: Modification of the AC terminal

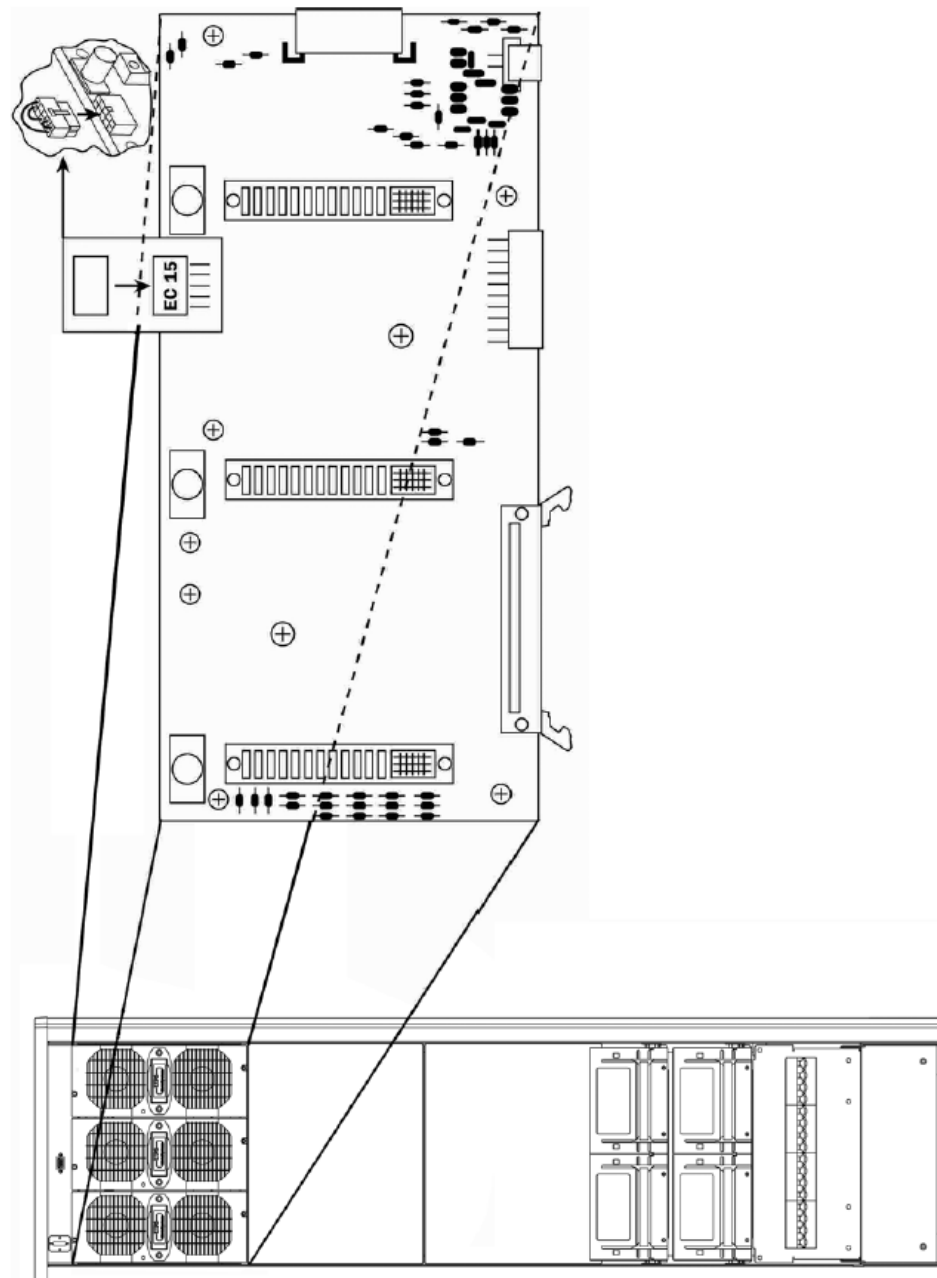
Make changes on the AC terminal as given in the following chapters.

second step: Fixing of the configuration plug

Mount the configuration plug on the Back Panel Board (already mounted Power modules have to be removed) in the socket EC 15. To remove the Power modules please refer to chapter MAINTENANCE.

third step: Change of the UPS configuration

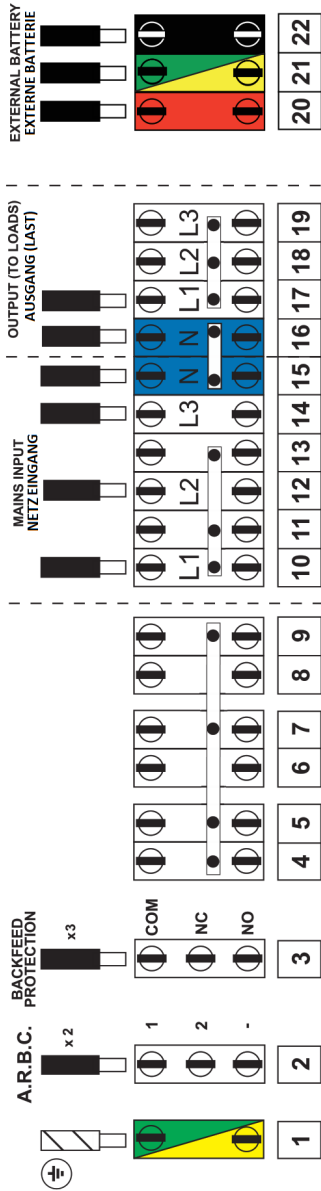
Before the first commissioning switch the UPS in SERVICE MODE. To do so please push the ENTER-button on the display-with connected battery system. The UPS is starting. Choose with the Arrow-buttons the item SETUP and the sub menu INVERTER. (Before you maybe ask to change the language). Choose the item SINGLE PHASE and accept by pressing the ENTER-button. Push the ESC-button as soon the basic menu is again reached. Switch off the unit by pressing the ON/OFF-button.



5. Installation

5.3.4 3-PHASE-Input, 1-PHASE-Output connection

For this type of connection, besides the wiring shown in the following figure, the software has to be configured via the instrument panel as illustrated in paragraph 6.4 STARTING PROCEDURE.



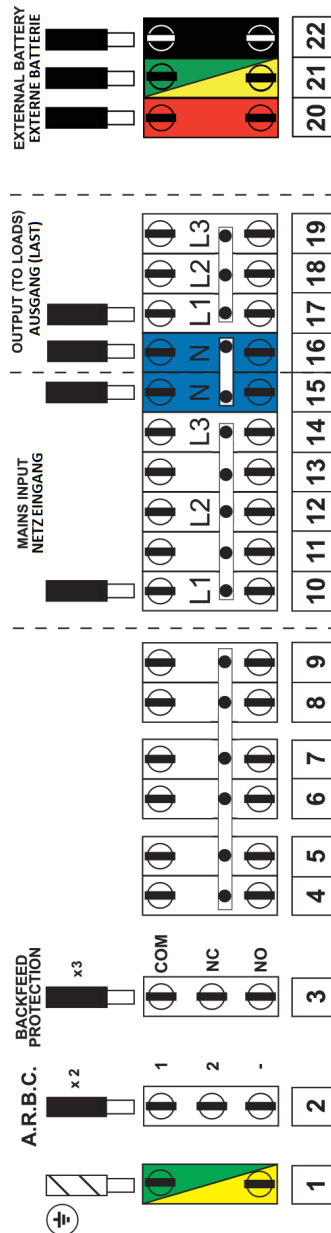
TRI POWER X33 MOD HP
10/15/20

WARNING
If the links are set for single phase output please take attention to chapter 5.3.3. If the setting are not done before the first commissioning the UPS can be completely damaged.

5. Installation

5.3.5 1-PHASE-Input, 1-PHASE-Output connection

For this type of connection, besides the wiring shown in the following figure, the software has to be configured via the instrument panel as illustrated in paragraph 6.4 STARTING PROCEDURE.



TRI POWER X33 MOD HP
10/15/20

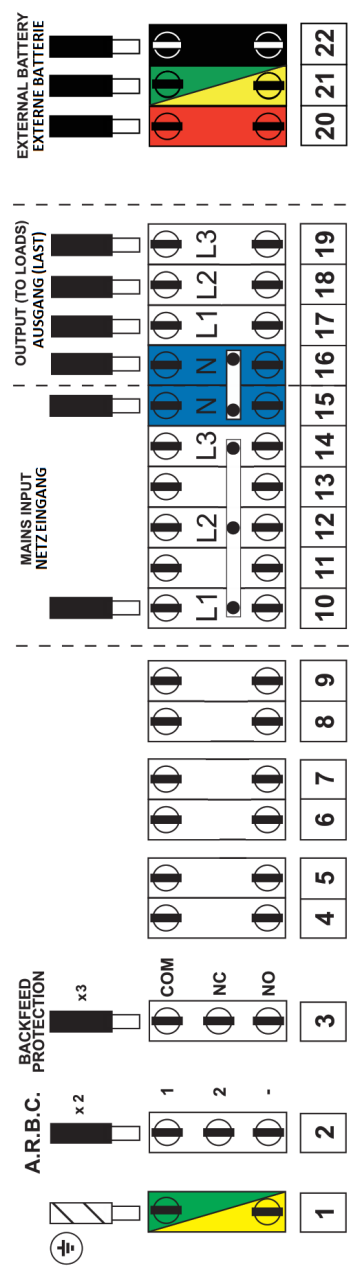


WARNING

If the links are set for single phase output please take attention to chapter 5.3.3. If the setting are not done before the first commissioning the UPS can be completely damaged.

5.3.6 1-PHASE-Input, 3-PHASE-Output 120°

For this type of connection, besides the wiring shown in the following figure, the software has to be configured via the instrument panel as illustrated in paragraph 6.4 STARTING PROCEDURE.



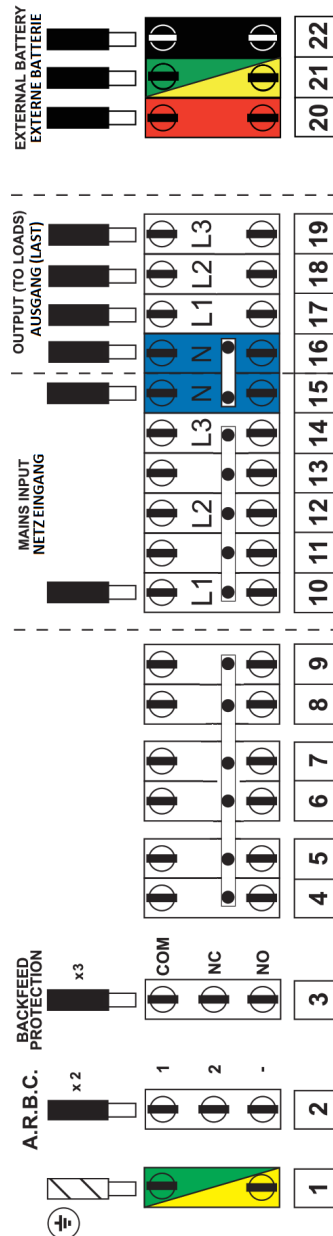
TRI POWER X33 MOD HP
10/15/20

ATTENTION In the Tri Power X33 Mod HP models 10, 15 and 20, in the case of a single-phase input and three-phase output configuration, the manual by-pass S1 **MUST NOT** be activated for any reason whatsoever. To this end the relative switch must be locked in the 'OFF' position. For greater safety it is possible to deactivate the by-pass completely by cutting the brown cable that connects the relative by-pass switch S1 to the MAINS INPUT fuse carrier isolating switch, isolating it. To the contrary, the cable connecting terminal 8 to the phase fuse carrier isolating switch **MUST** remain connected

5. Installation

5.3.7 3 independent 1-PHASEnOutput

For this type of connection, besides the wiring shown in the following figure, the software has to be configured via the instrument panel as illustrated in paragraph 6.4 STARTING PROCEDURE.



**TRI POWER X33 MOD HP
10/15/20**

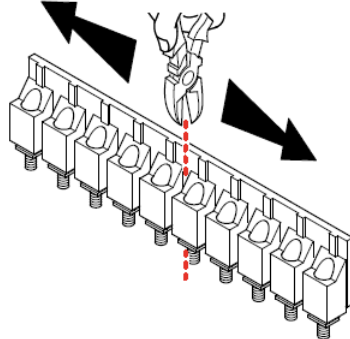


ATTENTION

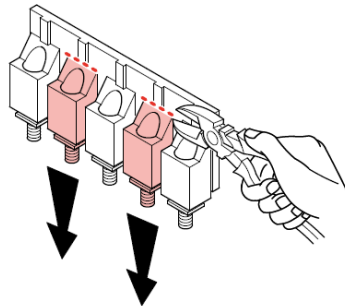
The input current is the summary of the 3 output phase currents driven by the Tri Power X33 Mod HP models 10, 15, and 20kVA.

5. Installation

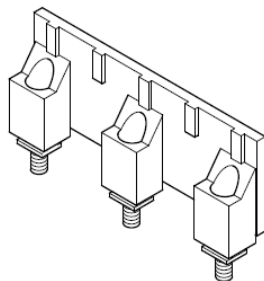
Take from the packet of accessories one cross-connector and cut it in order to get the required length.



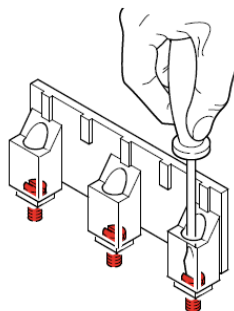
Cut vertical connectors not shown in connection blocks.



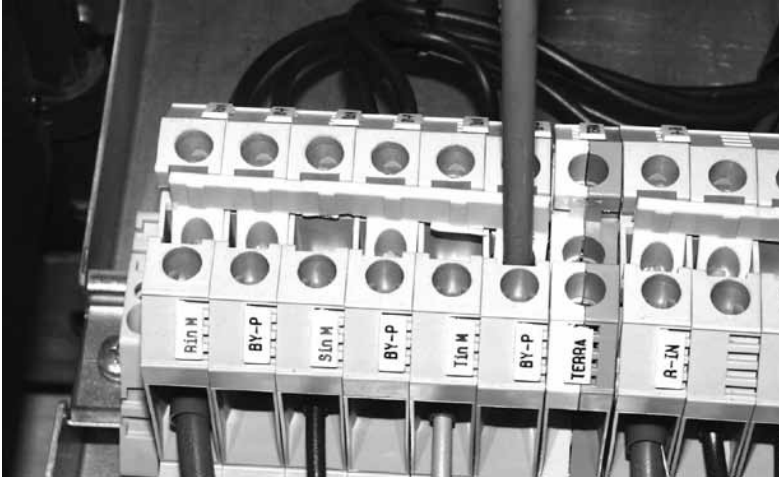
Insert the cross-connector into modular terminals as shown in connection blocks.



Secure the cross-connector to modular terminal with all the provided screws.



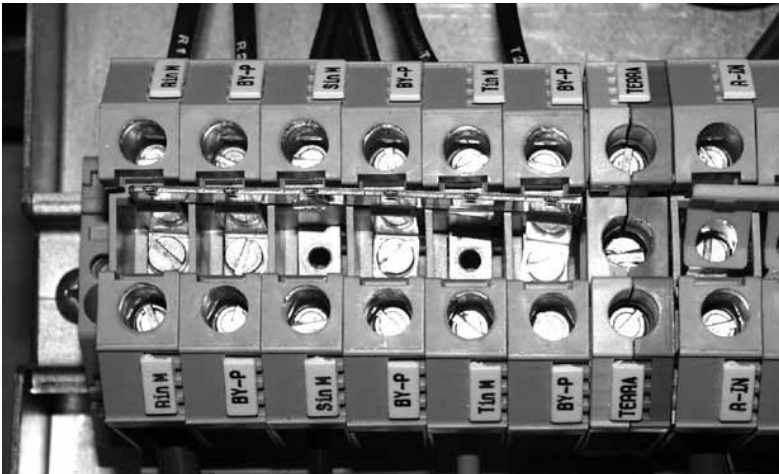
Screw all cross connectors



Remove the plastic cover



Check all cross connectors have been screwed properly



Insert the plastic cover

6. Configuration and Start-up



WARNING

The instructions given in this chapter are not for an ordinary operator but for a specialized, authorised technician. To be undertaken only if using the Personal Protective Gear specified in chapter 3.

As illustrated in the previous chapter the default configuration for the Tri Power X33 Mod HP UPS units entails a THREE-PHASE INPUT and a THREE-PHASE OUTPUT.

If this type of connection is used, the equipment requires no additional configuration as it has already been set in the factory.

If, however, the connection has been changed, then the following instructions **must** be referred to.

6.1 Input configuration

UPS Tri Power X33 Mod HP automatically recognises the voltage, frequency and number of phases in input even if the electrical connection on the terminal block is changed. So once the input wiring to the terminal block has been modified accordingly, no further configuration via the display is necessary.



ATTENTION

Please ensure the proper neutral connection before do the next steps.

6.2 Output configuration

The UPS Tri Power X33 Mod HP does not automatically recognise the electrical configuration on the output terminal block. Therefore, it is ALWAYS necessary to select the load type applied via the display.

The default configuration for the UPS Tri Power X33 Mod HP units is THREE 120° phases, 400 VAC. For powers of 8 to 30 kVA the unit can be configured to obtain just one single-phase output (230 VAC).

If the unit is configured with a three-phase output, it is possible to select management of the three phases as follows:

- **SINGLE-PHASE outputs:** this setting is necessary if one single-phase lines were created at the UPS output. Please be aware that in case of bypass operation the whole load connected to the input phase L1.
- **THREE single-phase outputs:** this setting is necessary if three separate single-phase lines were created at the UPS output. In this case, the UPS manages the three outputs separately one from the other. For example, if an excessive load is applied to one of the three output lines, the bypass will intervene only on the overloaded line while power is guaranteed on the other two by the UPS.
- **THREE 120° phases:** this is the default setting and it is normally used if three-phase loads have been applied in output from the UPS (e.g. three-phase electrical motors) or if three-phase and single-phase loads are being powered by the UPS. In this case the UPS manages the three output phases, protecting the three-phase load. For example, if an excessive load is applied to one of the three output lines, the automatic bypass switches all three output lines.

To select the system output configuration correctly on the display follow the instructions given in paragraph 6.4.

6.3 Checks prior to switch on

Check the following before powering the equipment:

1. Make sure the input switch S3 for powering the UPS in the distribution box is open;
2. Ensure that the fuse carrier isolating switches of the UPS batteries (F B+ and F B-) and those of the Tri Power X33 Mod HP BATTERY (if used) are open;
3. Check that the maintenance by-pass switch S1 and the UPS output switch S2 are both in the OFF position.
4. Ensure that the input and output wiring is correct;
5. check correct cycling of the phases in input;
6. Check that the mains input parameters (power voltage and frequency) are compatible with those specified on the UPS data plate.

INDICATION

Ensure that the link at the back of the UPS on connector H between Pin 3 and 4 is present (see chapter 5.2.4). If this link is not present the UPS is not able to start up and the message „E.P.O active“ is displayed and in advance the UPS is shut-down itself.

6. Configuration and Start-up

6.4 Starting procedure

1. Insert the battery fuses in the relative isolating switches (F B+ and F B-) and, if applicable, those in the Tri Power X33 Mod HP BATTERY cabinets ;
2. Close the switches (F B+ and F B-) and, if applicable, those in the Tri Power X33 Mod HP BATTERY cabinets (if they



ATTENTION

Before switch on the UPS the correct output configuration has to be selected (Single-phase/Three-phase 120° / Three separate phases).

exist;

3. With the unit off, press the ENTER key on the operator panel to gain access to the Service Mode. See the next chapter for more information about the SERVICE MODE and panel operation;
4. Follow this path: UPS Setup → Output → Inverter Select Single-phase / Two-phase /Three-phase 120° / Two separate phases / Three separate phases depending on the connection. Use the arrow keys to move the selection on the

INDICATION

The wiring and the settings of the UPS has to be in accordance together.



WARNHINWEIS

Wrong connections or output configuration settings can cause injury to people or damage to equipment!

display, the Enter key to confirm, the ESC key to cancel;

5. Following this path: UPS Setup → Batteries → KB. Choose the right numbers of battery strings connected to the UPS. Use the arrow keys to move the selection on the display, the Enter key to confirm, the ESC key to cancel;
6. Following this path: UPS Setup → Batteries → Capacity folgen. Choose the right capacity each string of connected batteries. Use the arrow keys to move the selection on the display, the Enter key to confirm, the ESC key to cancel. The UPS calculate the total capacity by multiplying the no. of string which each capacity;
7. Press the ON/OFF button on the UPS to switch off the unit. All parameters in SERVICE MODE will be stored at this time;
8. Close the Mains Switch S1 to power the UPS;
9. Press the ENTER button to switch the UPS on;
10. Wait until the status indicator on the display turns blue;
11. Check that the output voltage and frequency values set correspond to the applied load requirements. If they do not, enter the necessary values (see next chapter);
12. Close the output switch S2 on the UPS



ATTENTION

When the unit detects the input voltage it automatically proposes starting a battery charging cycle. Press the 'ESC' key to proceed to switching the UPS Tri Power X33 on.



WARNING

Even if the installation process is finished, the UPS is only without voltage, if the input switch S1 and the circuit breaker upstream is open. Only with this condition there is no voltage on the AC terminal present!

If the UPS has internal batteries it will also be necessary to open at least one box for each set (one set consists of 4 boxes). This cuts the power voltage off to the terminal block generated by the various sets of batteries. This must be done for all sets.



Before programming or starting the unit, make sure that all the modules (inverter and/or battery boxes) are closed and fixed with the screws.

Close the door and take the keys out.

6.5 Battery discharging curve

With the UPS TRI POWER X33 MOD HP it is possible to increase the calculation accuracy of the autonomy time in case of mains fault.

Option 1

If the archive includes manufacturer-specific discharging curves please choose by menu:

Load curve from archiv:

UPS Setup -> Batteries -> Discharge curve -> Load from archive

Entladekurve ansehen

USV Setup -> Batteries -> Discharge curve -> View from Archive or View curve in use



HINWEIS

Discharging curves can only be uploaded by the manufacturer.

Option 2

It is possible to store a customized curve with given discharging voltages:

UPS Setup -> Batteries -> Discharge curve -> Custom

-> Power: Battery block characteristic which specifies the typical discharge process

-> Data: Minimum 3 and maximum 20 pairs of data have to be put in. Each pair consists of voltage and its discharge time.

The data pairs should be chosen in a way to show the best characteristic of the whole discharge curve. The pair should be on the part of the discharge curve where most changes appear. As more data is given, the curve is described more accurately.



HINWEIS

The first data pair is the discharge starting and the last will be the end of discharge point.

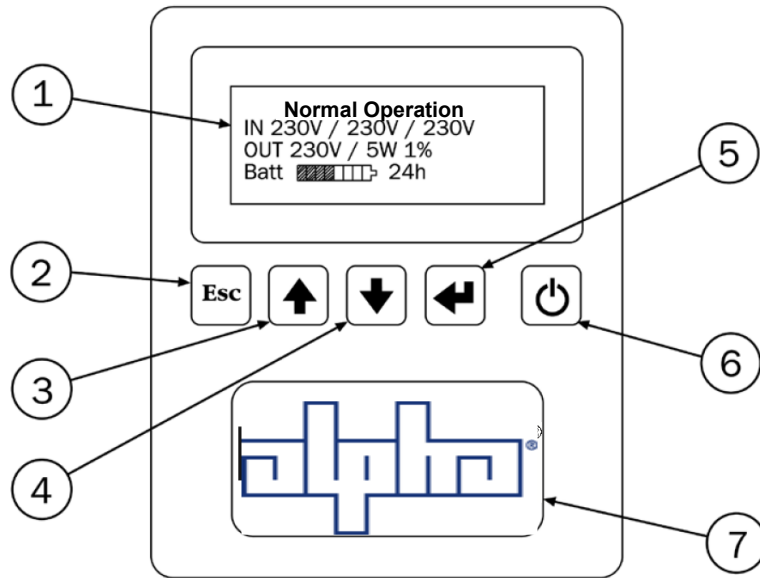
6.6 Autonomy recalculation

During battery discharge UPS TRI POWER X33 MOD HP recalculates the autonomy time in line with the actual load; this is factory setting. It is possible to stop this recalculation. This is useful if a manufacturer discharge curve is used. To change the factory setting please follow:

Misc -> Calibration -> Automatic -> ENABLED/DISABLED

7. Control panel

The control panel, at the front of the unit, has a 4-line, 20-character LCD display, a backlit multicolour status indicator and a 5-key keypad.



The keys on the front panel are used to gain access to the UPS menus.
Item

1 LCD-Displayt



2 ESCAPE

Functions:

- Exit a function without modifying;
- Goes from a lower to higher menu level;
- Exit the main menu and return to displaying status;
- Silencing the acoustic alarm.

3 -UP ARROW

Functions:



- Selects the previous function;
- Erhöhung des Werts innerhalb einer Funktion;
- Increase a value inside a function or toggle (ENABLE, DISABLED);
- Scrolls the menus that contain more than 4 lines;

4 DOWN ARROW

Functions:



- Selects the next function;
- Reduces a value inside a function;
- ;Decrease a value inside a function or toggle (ENABLE, DISABLED);
- Scrolls the menus that contain more than 4 lines.



5 ENTER

Functions:

- Confirm a value;
- Accesses a menu item;
- Goes from a higher to a lower level;
- Enter the SERVICE MODE.



6 ON/OFF

Main functions:

- Start and stop the operation of the UPS. To switch off press the button more than 2 seconds;
- Switch off single phases (only possible in single phase mode), press the button 0,5 seconds only.

7 Multicolor status indicator (red—violet—blue).

7.1 Service Mode function

Even when it is off the UPS Tri Power X33 Mod HP allows you to make all basic settings and programming at time of first commissioning. Also inside this mode you are able to perform software updates. With the 'ENTER' key the UPS enters the 'Service Mode' and from here it is possible to access the DISPLAY menu. You have the choice between seven languages: English, German, France, Russia, Spanish and Polish.

To exit this mode press the 'ON/OFF' key otherwise the UPS exits the function automatically and turns itself off after 20 min. if it has not received any communication.

7.2 Main menu and submenus

To start up the UPS in a normal way you have to press the ON/OFF-button. The initialization process starts shown by start bar. At the end of the start-up procedure the main frame appears on the display.

Be aware that the UPS will supply output voltage as soon the initialization process has finished and the main frame appears on the display.




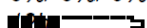
With the Arrow button you are able to scroll through the main page to access different kind of measures.

The main display shows the following pages:

1. Input - Output - Battery capacity
2. Input - Load - Battery capacity
3. Bypass - Output - Battery capacity
4. Bypass - Load - Battery capacity
5. Power on output
6. Measurement Output (phase to neutral)
7. Measurement Output (phase to phase)
8. Measurement Input
9. Measurement Bypass (phase to phase)
10. Battery system

7. Control panel

The following pictures showing the different pages of the main frame.

MAIN PAGE	DESCRIPTION
<p>1 Input - Output - Battery capacity</p> <div> Tri Power X33 Mod HP IN ^230V/226V/227V OUT ^230V 93W 0% Batt.  </div>	<p>1. line: Status UPS; 2. line: Input voltages; 3. line: Output voltage, Active power connected load, percentage of load (will show the phase most powered); 4. line: Bar graph with battery capacity and autonomy if on battery.</p>
<p>2 Input - Load - Battery capacity</p> <div> Tri Power X33 Mod HP IN ^230V/228V/227V OUT 0%/ 0%/ 0% Batt.  </div>	<p>1. line: Status UPS; 2. line: Input voltages; 3. line: percentage of load each phase; 4. line: Bar graph with battery capacity and autonomy if on battery.</p>
<p>3 Bypass - Output - Battery capacity</p> <div> Tri Power X33 Mod HP BYP ^230V/231V/229V OUT ^230V 95W 0% Batt.  </div>	<p>1. line: Status UPS; 2. line: Bypass voltages; 3. line: Output voltage, Active power connected load, percentage of load (will show the phase most powered); 4. line: Bar graph with battery capacity and autonomy if on battery.</p>
<p>4 Bypass - Load - Battery capacity</p> <div> Tri Power X33 Mod HP BYP ^232V/231V/229V OUT 0%/ 0%/ 0% Batt.  </div>	<p>1. line: Status UPS; 2. line: Bypass voltages; 3. line: percentage of load each phase; 4. line: Bar graph with battery capacity and autonomy if on battery.</p>
<p>5 Load on Output</p> <div> Tri Power X33 Mod HP L1o 0.4/ 40kVA 1% L2o 0.5/ 40kVA 1% L3o 0.5/ 40kVA 1% </div>	<p>1. line: Status UPS; 2. line: Phase L1: load in KVA or W, percentige according rated power; 3. line: Phase L2: load in KVA or W, percentige according rated power; 4. line: Phase L3: load in KVA or W, percentige according rated power.</p>
<p>6 Messures Output (phase to neutral)</p> <div> Tri Power X33 Mod HP L1o231V 1.7A 27W L2o229V 1.6A 31W L3o231V 1.9A 29W </div>	<p>1. line: Status UPS; 2. line: Phase L1 Output: voltage, current (True RMS), active power; 3. line: Phase L2 Output: voltage, current (True RMS), active power; 3. line: Phase L3 Output: voltage, current (True RMS), active power.</p>
<p>7 Messures Output (phase to phase)</p> <div> Tri Power X33 Mod HP L1o-L2o Δ 400V L2o-L3o Δ 399V L3o-L1o Δ 396V </div>	<p>1. line: Status UPS; 2. line: Phase L1 - L2 Output: voltage, current (True RMS), active power; 3. line: Phase L2- L3 Output: voltage, current (True RMS), active power; 3. line: Phase L3 - L1 Output: voltage, current (True RMS), active power.</p>

MAIN PAGE	DESCRIPTION
<p>8 Measures Input (phase to neutral)</p> <div> Tri Power X33 Mod HP <i>L1i229V 3.4A 408W</i> <i>L2i228V 2.9A 162W</i> <i>L3i230V 2.6A 228W</i> </div>	<p>1. line: Status UPS; 2. line: Phase L1 Input: voltage, current (True RMS), active power; 3. line: Phase L2 Input: voltage, current (True RMS), active power; 3. line: Phase L3 Input: voltage, current (True RMS), active power.</p>
<p>9 Measures Output (phase to phase)</p> <div> Tri Power X33 Mod HP <i>L1b-L2b Δ 401V</i> <i>L2b-L3b Δ 402V</i> <i>L3b-L1b Δ 400V</i> </div>	<p>1. line: Status UPS; 2. line: Phase L1 - L2 Output: voltage, current (True RMS), active power; 3. line: Phase L2- L3 Output: voltage, current (True RMS), active power; 3. line: Phase L3 - L1 Output: voltage, current (True RMS), active power.</p>
<p>10 Battery system</p> <div> Tri Power X33 Mod HP <i>Batt. ^288V -0,3A</i> <i>C 50% R 12h T 24h</i> <i>im Ladeprozess - Halt.</i> </div>	<p>1. line: Status UPS; 2. line: Voltage and current (negative - charging, positive - discharging); 3. line: Battery capacity, remaining autonomy, autonomy at 100% battery capacity; 4. line: Status battery system - Battery system standby (no charging) - battery discharging - end of autonomy - Boost charge (charging phase 1) - Charging (phase 2, current decreasing) - Float charge - Battery teste - Equalization charge - Battery broken - max. charging time override</p>

You are able to scroll throught the pages with the ARROW keys.

INDICATION

To enter into the main menue press ENTER. The main pages are listed below:

- STATUS UPS: give real time informations of Status of UPS
- SETUP UPS: possible to set up basic configurations (some only available through SERVICE-MODE);
- POWERMODULE: analyse the status of each module in real time;
- EVENTS: give access to the event log of UPS
- MEASURES: give access to a number of possible measurements inside UPS.
- LOG OUT: if you entered by password you log out and your visit will be closed.

You have access to the sub menus by pressing the ENTER key at a selcted item. The following grid give informations to the available sub menus.

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UPS STATUS	UPS SETTING	POWER MODULE	EVENTS	TOOLS	LOG OUT (o)
UPS Info	Options	PM Status	Events	Battery test	
UPS Setup	Output	Diagnostics (*)	Delete	Signaling Test (*)	
Measurements	Input	PM SW Update (*)		Test LCDisplay (*)	
Alarms	Bypass			Service	
Historical Data	Batteries			Fault-Reset CM	
	Operator Panel				
	Clock Setting				
	Contact Interface				

(*) Only available in „SERVICE-MODE“

(o) Available if password setted

The UPS has a menu structure with sub menus in tree structure. The functions are described in the following chapter. On the display are arrows on the right side which give a hint that more items are available in the given directions. To access these items use the arrow keys.

7.2.1 Status UPS

Info USV	Modell TRI POWER X33 MOD HP	Equipment model
	Synchronisation adress	Synchronisation adress of the command
	CM-Number	Number of the given command
	VA max	Maximum supplaiaable apparent power [kVA]
	W max	Maximum supplaiaable active power [kW]
	IBat max	Maximum charge current [A]
	SW Vers.	Firmware-Version of UPS
	PM SW Vers.	Firmware-Version of Power module
	SW Ver.Boot	Version of Bootloaders of UPS
	S/N	Serial number of UPS

USV Setup	Inverter	Configuration: 1-phase / 3-phase 120° / 3 single phases
	Input	Configuration: 1-phase / 3-phase / 3-phase reverse / not defined
	X/X - X/X -X/X	X (count) Power module each phase
	No. BCM	no. of installed Power chargers
	No. KB	No. of installed battery strings (4 Battery module = 1 string KB)
	Batt.Cap.	Battery capacity each battery module
	No. each string	total no. of battery blocks 12V each string

Measurements	Output X	Power	Active power supplied by UPS on phase X [W]
		App.Pow.	Apparent Power supplied by the UPS on phase X [W]
		Vrms	Effective voltage supplied by UPS on phase X [V Rms]
		Vrms ph-ph	Effective line voltage supplied by UPS on phase X [V Rms]
		Irms	Effective current supplied by UPS on phase X [A Rms]
		Peak I Val.	Peak current supplied in output from the UPS on phase X [A]
		Frequency	Frequency of the sinusoid voltage in output from phase X [Hz]
		Crest Factor	Crest factor of the load connected on phase X
		Power factor	Power factor of the load connected to the UPS on phase X
		W Max	Maximum available active power on phase X [W]
		Wirklstg.	actual active power on phase X [W]
		VA Max	Maximum available apparent power on phase X [VA]
		Scheinlstg.	actual appartent power on phase X [VA]

Note: To change the phase X press the ENTER key.

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Measurememnts	Input X	Power	actual active power on phase X [W]
		App.Power	actual appartent power on phase X [VA]
		Vrms	Effective voltage on phase X [V Rms]
		Vrms ph-ph	Effective line voltage on phase X [V Rms]
		Vrms Bypass	Effective bypass voltage on phase X [V Rms]
		Irms	Effective current on phase X [A Rms]
		Peak I Val.	Peak current on phase X [A]
		Frequency	Frequency of the sinusoid voltage phase X [Hz]
		Crest Factor	Crest factor on phase X
		Power factor	Power factor on phase X

Note: To change the phase X press the ENTER key.

Mearurements	Battery	Voltage	Voltage measured at the ends of the batteries [V]
		Current	Current supplied by the batteries (negative if the batteries are being charged) [A]
		Residual Capac	Battery charged status, expressed as a percentage [0-100%]
		chg Status.	Status battery system <ul style="list-style-type: none"> - Battery system standby (no charging) - battery discharging - end of autonomy - Boost charge (charging phase 1) - Charging (phase 2, current decreasing) - Float charge - Battery teste - Equalization charge - Battery broken - max. charging time override
		Tot autonomy	Total autonomy the UPS would have with batteries charged 100%
		Res. autonomy	Residual autonomy of the UPS
		End of aut V	Battery threshold voltage for end of autonomy
		No, run down	Total number of times the batteries have been completely run down
		Use	Total number of hours the UPS has been running on battery
		Cal.	Day and time the last calibration was made
		No.Calibration	Total number of calibrations made

Measurememts	Misc.	Int. Temp	Temperature inside the UPS [°C]
		Pos.H.V.Bus	Voltage on the DC BUS positive [V]
		Pos.H.V.Bud	Voltage on the DC BUS negative [V]

Alarms	see chapter 8
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Note: To check all alarms please use the DOEWN ARROW and UP ARROW button.

Historical Data	UPS operation	Total time the UPS has been working
	With Battery	Total time the UPS has been running on battery
	Battery charger Op.	Total time the battery charger has been working
	Tot. Run downs	Total number of times the batteries have been completely run down
	Booster Int.	Total number of Booster interventions
	Bypass Int.	Total number of Bypass interventions
	Batt. Calibr.	Total number of battery calibrations
	Battery ch.Cycles	Total number of battery charger cycles
	Batt. Eq.cycles	Total number of battery equalisation cycles
	No Load>80%	Total number load was >80%
	Time Load>80%	Total time load was >80%
	No Load>100%	Total number load was >100%
	Time Load>100%	Total time load was >100%

7. Control panel

7.2.2 Settings

Options	Start with Battery	If enabled, it allows the UPS to be started when there is a power failure
	Restart	If enabled, it allows automatic restarts after complete discharge of batteries

Output	Voltage	It sets the output voltage value [V]	
	Frequency	It sets the output frequency value [Hz] <ul style="list-style-type: none">Rated Value: it allows the output frequency value to be set (50 or 60 [Hz]) regardless of the supply voltage frequency.Automatic Select.: if enabled the UPS measures the input voltage frequency and synchronises the output to the same value. If disabled the UPS uses the Nominal Value as the setting.	
	Inverter (*)	It sets the output configuration and the load applied <ul style="list-style-type: none">Single-phase: just one single-phase outputThree-phase 120°: three-phase output suitable for supplying threephase loads (e.g. a motor)Three separate phases: three single-phase output lines separate from each other	
	Status each phase at start up (**)	Phase L1	Give the opportunity to program the status at start up: <ul style="list-style-type: none">- always on: phase at start up present- always off: phase at start up not present- last status: phase restart same condition before switch off
		Phase L2	
Phase L3			

(*) Only available at „SERVICE-MODE“

(**) only available if 3 single phases programmed

Input	PLL enabling	If enabled, the UPS synchronises the output voltage with the input. If disabled, the output voltage is not synchronised with the input and is signalled by the flashing of the status indicator (blue).
	Extended PLL range	If enabled, the UPS synchronises the output voltage with the input for frequency variations of $\pm 14\%$ of the nominal value. If disabled, the UPS synchronises for variations of frequency of $\pm 2\%$.
	individ Intervall PLL (o)	To adjust the synchronisation range from minimum 0,5 Hz up to 7,0 Hz in 0,1 Hz-steps
	DIP enabled	enable and disable the DIP function (see Bypass)

(o) Menu item only available if the PLL Intervall „INDIVIDUAL“ is selected

Note: With the PLL function the output frequency is synchronised with the mains input of the UPS. There is no interruption of supply of the load also if the load is supplied through the bypass, for example in overload condition. The control secures the switching at zero crossing of the voltage.



ATTENTION

If the PLL function is disabled the automatic bypass function is disabled automatically as well. If the overload is prolonged the UPS switches off (see 'Overload permitted' in the Technological Description chapter).

Bypass	Bypass Enabling	If enabled, the UPS controls triggering of the bypass automatically. If disabled, the UPS will never switch over to bypass and, therefore, in the case of a prolonged overload (see 'Overloaded permitted' in Chap. 10), or in the case of a failure and redundancy absence, the UPS switches off.
	Forced Mode	If enabled, the UPS activates the bypass permanently
	DIP Speed	It allows variation of the automatic bypass activation sensitivity (forced mode disabled) <ul style="list-style-type: none"> • SLOW: loads that are not sensitive to drops in voltage or microinterruptions but which provoke frequent current peaks. • STANDARD: normal uses. • FAST: loads sensitive to the microinterruptions
	Bypass Start Mode	It can be enabled or disabled. Enabled the load will be supplied through bypass before inverter starts.

Batteries	Threshold Values	Autonomy end warning	Setting the start time of the end of battery autonomy warning [min.]
		maximum battery time	Maximum time the UPS run on battery [Sec]. After the preset time the UPS will switch off independently of the battery capacity. In OFF position the function is disabled.
	Battery charger	Charge in Standby	If enabled, it enables battery charging with the UPS off
	Restart	Restart Enabling	Enables or disables restarting of the unit when mains power returns after the batteries have run down completely
		Minimum autonomy	Minimum percentage of autonomy to preserve
	Total KB	Sets the total number of KBs installed (1 KB = 4 battery boxes) Necessary for the UPS to supply correct autonomy values on the basis of the load applied	
	Capacity (*)	Sets the capacity value of the batteries in the UPS [Ah]	
	Discharge curve	Load from archiv	Load discharge curve from archive
		View from archive	View discharge curve from archive or in use
		Custom	Power: capacity (Ah) Data: 3 - maximal 20 data pairs (voltage/time) 1. pair (starting), last pair (end of discharge)

(*) Only available in „SERVICE-MODE“



ATTENTION

The correct numbers of strings and the correct battery capacity each string has to be given. A non correct information can damage the battery system and/or the battery charging can be incorrect.

7. Control panel

Control panel	Language	Sets the display language
	acoustic alarm	Enables/disables the acoustic signalling
	Keyboard Beep	Enables/disables the acoustic signalling when the keys are pressed
	Switch off (*)	Enables password request at switch OFF unit
	Display Backlighting	Sets display backlighting <ul style="list-style-type: none"> Fixed: always lit Timed: lighting turns off if the keyboard is not used for a few seconds Disables: lighting always off
	Display contrast	Sets display contrast
	Password	Sets a password that prevents access to UPS settings
	Password level	The default setting is in the USER item

(*) Only available if password setted

Clock setting	TT/MM/JJ - HH:mm:ss	Date/System time of UPS: „ENTER“: set marker to change value „ARROWS“: up/down value TT = day; MM = month; JJ = year; HH = hour; mm = minutes; SS: seconds.
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Relay contacts	contact 1	Function	enables to program function of contact: - Mains / battery - Reserve autonomy - UPS fault - Overload - Bypass
		Configuration	toggle to program contact NO / NC: - NORMAL OPEN - NORMAL CLOSED
	contact 2	Function	identical to contact 1
		Configuration	
	contact 3	Function	identical to contact 1
		Configuration	
	contact 4	Function	identical to contact 1
		Configuration	
	contact 5	Function	identical to contact 1
		Configuration	
	all	toggle to program contact NO / NC for alle contacts: - NORMAL OPEN - NORMAL CLOSED	

7.2.3 Power module

PM Status	PM X Info	Mod	Model of power module X	
		SW Vers.	Firmware version inside the power module X	
		HW Vers.	Hardware version of the power module X	
		S/N	Serial number of the power module X	
		Max VA	Maximum apparent power suppliable by the power module X [VA]	
		Max W	Maximum active power suppliable by the power module X [W]	
		Max Ichg	Maximum current suppliable by battery charger power module X [A]	
	PM Measurement	Input X	Power	Power absorbed by the mains by the power module X [W]
			Appar. Power	Apparent power absorbed by the mains by the power module X [VA]
			Vrms	Effective voltage in input to power module X [V RMS]
			Linked Vrms	Input line voltage to the power module X [V RMS]
			Bypass Vrms	Effective voltage in input to the power module X for the bypass line [V RMS]
			I rms	Effective current absorbed by the power module X by the mains [A RMS]
			Peak I Value	Peak current absorbed by the power module X by the mains [A]
			Frequency	Frequency of the sinusoid voltage in input to the power module X [Hz]
			Peak I Factor	Peak factor applied by the power module X to the mains
			Power Factor	Power factor applied by the power module X to the mains
		Output X	Power	Active power supplied by the power module X [W]
			Appar. Power	Apparent power supplied in output by the power module X [VA]
			Vrms	Effective voltage supplied in output by the power module X [V RMS]
			Linked Vrms	Line voltage in output by the power module X [V RMS]
			I rms	Effective current supplied in output by the power module X [A RMS]
			Peak I Value	Peak current supplied in output by the power module X [A]
			Frequency	Frequency of the sinusoid voltage in output from the power module X [Hz]
			Peak I Factor	Peak factor of the current in output from the power module X
			Power Factor	Power factor in output from the power module X
			Max W	Maximum active power suppliable by the power module X [W]
			Power	Maximum active power suppliable by the power module X, expressed as a percentage
			Max VA	Maximum apparent power suppliable by the power module X [W]
			App. Power	Maximum apparent power suppliable by the power module X, expressed as a percentage

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PM Status	PM Measure-ments	Battery X	Voltage	Voltage measured at the ends of the batteries by the power module X [V]
			Current	Current required to the batteries from the power module X (negative if the batteries are being charged) [A]
			Batt. Cahrger	Status of the battery charger inside module X
		Misc. X	INV. dissip. Temp.	Temperature of the INV dissipater (Inverter) of the power module X [°C]
			BST dissip. Temp.	Temperature of the BST (Booster) dissipater of the power module X [°C]
			Fan speed	Fan speed expressed as a percentage of the power module X
			Pos.H.V.Bus	Voltage on the DC BUS positive of the power module X [V]
			Neg.H.V.Bus	Voltage on the DC BUS negative of the power module Xm [V]
	PM histori-cal data	Run Time	Total time working	
		Battery time	Total time running on battery	
		BattCharg time	Total time the battery charger has been working	
		Bypass int.	Total number of bypass interventions	
		Battery int.	Total number of battery interventions	
		Dumper int.	Total number of dumper interventions	
		No. Overheat	Total number of overheatings	
		No. Overloads	Total number of overloads	
		No. HV Bus run	Total number of overvoltages on the Bus	
		No. Out DC Level	Total number of continuous voltage presences in output from the PMs	

Note: To choose the Phase X press the ENTER key.

Diagnostics (*)	Reset PM Errors	Deletes the memory of errors found in the power module.
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PM SW Update (*)	Update all the PWs	It allows the sequential and automatic updating of the internal software of all the UPS power modules. Press 'ENTER' to start the procedure. If the update is unnecessary the following message appears on the display: 'PM SW versions updated!' Press 'ESC' to exit the frame.
	Update a single PW	It allows the updating of the internal software of a single power module. Using the 'ARROW' keys you select the module you wish to update ('PM00' indicates the module at the top on the left, going on to the last one at the bottom on the right). By pressing 'ENTER' key a frame appears that gives a comparison between the software that is actually in the module selected and the software you are about to load. Press 'ENTER' to start the update procedure. Once updated, the message 'PM SW version updated!' appears on the display. Press 'ESC' to exit the frame.

(*) Only available in „SERVICE-MODE“.

7.2.4 Events

Events	Visual Display	All	Displays all the events
		Critical	Displays events thta have generated critical alarms
		warning	Displays events that have generated non critical alarms
		Info	Displays events that have generated simple informati-on
	Deletion	All	Deletes all the events

7.2.5 Tools

Batteries	Battery test	Manual	the following parameters can be setted: - nubers of Power modules included inside test - battery voltage the test stops -with ENTER the test will start - with ESC the test will be canceled
		Batt. Calibration	Calibrates the batteries, measuring the run down curve. If the battery is changed, we recommend carrying out this cycle so that the UPS provides precise information about the charge status
		Battery Cycle	Carries out a run down and recharge cycle so as to assess the dynamic behaviour of the batteries

Test Display (*)	Tests the luminous signals. Press 'ENTER' to carry out the test on the signals of the status indicator (blue, violett and red) and the acoustic signals
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LCD-Display Test	Tests the alphanumeric display. By pressing 'ENTER' all the characters available on the alphanumeric display are shown.
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(*) Only available in „SERVICE-MODE“.

Service	Identification code	on request of service department the code has to be given for informati-on
	Code input	on request of service please type in the given code

CM-fault restore	delete all stored faults inside Power module
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7. Control panel

7.2.6 Log out

To prevent the UPS against wrong settings by not authorised persons it is possible to set a password. If a password is set it is necessary to authorise any changes by a password. One time you logged in you are able to make any changes. After the session you have to close it by go to the menu item „Log Out“ and press the ENTER key. If you have lost your password please contact the service.

7.2.7 Turning the single phases on and off

When the inverter output is configured as three separate single-phase lines, by very lightly pressing the On/Off key it is possible to gain access to a particular menu where you can choose which of the three phases L1, L2, L3 to turn on or off independently from the others.

7.2.8 Shutting down the UPS



ATTENTION

The shutting down procedure described below is to be used only and exclusively if the load applied to the UPS is off or does not need powering by it.

1. Check there is no need to power the connected loads;
2. Hold down the ON/OFF button on the UPS control panel for minimum 2 seconds;
3. Quit for security the question „UPS switch off?“ with the ENTER key;
4. Wait end of the shutdown process;
5. Open the output switch S2;
6. Open the input switch S3;
7. Open the battery disconnecting switches (F B+ and F B-) of the unit and of the Tri Power X33 Mod HP BATTERY system (if present).

If you expect to leave the UPS off for a long time, please read carefully and put into practice what is prescribed in paragraph 4.4 concerning storage.

If these operations are done correctly, there will be no voltage in the UPS Tri Power X33 Mod HP.

8. Diagnostics

8.1 Indicator lamps and acoustic signals

The operating status indicator, on the front panel of the UPS, and the LED on the front of each power module, change colour depending on the actual operating status of the UPS or of the single power module, according to the following table:

INDICATION

Some luminous signals can be accompanied by an acoustic signal. Press the 'ESC' key to turn the acoustic signal off; each time it is pressed after this you will either enable or disable the acoustic signal.

Status Indicator	Power Module-LED(s)	Acoustic Signal	Message on Display	Description and operation advices
BLUE fixed	GREEN fixed	-	TRI POWER X33 MOD HP	Normal operation with mains present and load within limits
BLUE fixed	GREEN fixed	-	5V BATTERY FLAT	The 3V-battery on the Control PCB is broken and has to be changed
BLUE fixed VIOLETT intermittent	ORANGE Intermittent	-	OUTPUT PHASE OFF	One phase was switched off (only available in 3 single phase mode)
BLUE fixed	1 Module ORANGE fixed other Modules GREEN fixed	-	CHARGING	The battery system will be charged.
BLUE fast intermittent	GREEN fast intermittent	-	-	The output voltage of this-Module is not synchronised with the input mains and/or the mains frequency is outside limit (>68Hz or <43Hz) and/or PLL disabled
BLUE fast intermittent	-	-	-	Bypass available, PLL disabled, Bypass voltage out of limit, Bypass sequenc not correct, Bypass frequency out of tolerance
BLUE fast intermittent	GREEN fast intermittent	-	BYPASS INOUT KO	The UPS signals that the bypass is unusable
VIOLETT fixed	ORANGE fast intermittent	-	UPS ON BYPASS	Operation on Bypass
VIOLETT fixed	ORANGE fixed	short intermittent (every 12 Sek.)	UPS ON BATTERY	Running on battery
VIOLETT fixed	ORANGE fixed	-	BATTERIE CALIBRATION	A battery calibration is on work
VIOLETT fixed	-	-	BATTERY TEST	Battery test running

Fortsetzung nächste Seite

8. Diagnostics

Status Indicator	Power Module-LED(s)	Acoustic Signal	Message on Display	Description and operation advices
VIOLETT intermittent	GREEN fixed	-	BATTERY FAULT	The battery system has to be checked
VIOLETT intermittent	ORANGE fast intermittent	-	USV ON BYPASS	The load is supplied through bypass
VIOLETT intermittent	ORANGE fast intermittent	-	MANUELL BYPASS	The load is supplied through manuel bypass
VIOLETT short intermittent -break	ORANGE fixed	double intermittent- break	AUTONOMY-RESERVE	Autonomy reserve. When running on battery wrong connection to the battery
RED fixed	RED fixed on one Module	fast intermittent	CHARGER BROKEN	The charger section on minimum 1 module is broken
RED fixed	ROT fixed on one Module	fast intermittent	MODULE FAULT	Minimum one module is fail. Possible defects: Inverter, Booster/PFC, Communication between CM and PM, Battery connection, Mains connection, HVBus.
RED fast intermittent	-	fast intermittent	BATTERIE KO	The battery system is broken or not connected
RED fast intermittent	RED double intermittent - break	fast intermittent	BATTERY VOLTAGE HIGH	Battery voltage out of limits (too high) - check
RED fast intermittent	RED double intermittent - break	fast intermittent	HVBUS RUNAWAY	The voltage of HVBus is to high - check
RED fast intermittent	RED double intermittent - break with Power module in alarm	fast intermittent	OVERTEMPERATUR	The internal temperature is to high - check enviroment temperature or fans
RED fast intermittent	RED double intermittent - break with Power module overload	fast intermittent	OVERLOAD	Load on minimum one Power module to high
RED fast intermittent	-	fast intermittent	FUNCTION CM KO	Communication failure between PM and CM
RED fast intermittent	-	fast intermittent	BACKFEED	Problem on BACKFEED PROTECTION detected

8.2 Messages

In this paragraph the messages that appear on the unit's display are listed, also giving the most likely cause that could have generated them. If you are unable to solve the problem then please contact the Technical Service.

FIRST LINE OF THE MAIN FRAME

Message	Meaning
SERVICE MODE	UPS in the Service Mode. All settings via the display, maintenance functions and updates are possible
UPS START-UP	UPS starting up. The UPS control system checks the correct configuration status before entering the 'Normal' or 'Service' operating mode. The UPS is in Bypass during this initialisation phase.
UPS IN BYPASS	UPS in Bypass. The load is not protected by the UPS in this configuration.
FORCED BYPASS	The UPS has entered the forced Bypass mode via configuration on the display
BYPASS INPUT KO	Bypass input KO; some problems have arisen on the Bypass line. It is not possible to feed the loads directly off the mains.
OUTPUT OFF	Output off. Configuration obtained via the display or subsequent to a UPS malfunction
UPS ON BATTERY	UPS on battery. The cause for this configuration is a failure in the UPS feeding system.
BATTERY CALIBRATION	The UPS is calibrating the batteries.
BATTERY TEST	The UPS is testing the batteries to check their status and that they are working properly.
BATTERY EQUALIS.	The UPS is equalising the batteries.
BUZZER OFF	The buzzer is turned off.
AUTONOMY RESERVE!	Battery charge level is at minimum.
MODULE FAILED	One or more Power Modules have failed. They must either be repaired or changed.
BATTERIES KO	Batteries failed. Check their operation and replace them if necessary.
OVERLOAD	The total load is higher than the UPS's rated power. Switching to Bypass.
OVERHEATING	The temperature inside the UPS is outside the nominal range.
DC OUT LEVEL FAILURE	A failure of the UPS has caused a DC voltage in output.
HVBUS RUNAWAY FAILURE	A failure of the UPS has caused a voltage level on the High Voltage Bus out of control.
RUNAWAY BATTERIES	Battery voltage out of control. Either the batteries or battery charger are/is malfunctioning.
3V BATTERY FLAT	The control board's 3V battery is flat.
SHUTDOWN IN PROGRESS	The UPS is shutting down.
BATTERIES BEING CHARGED	The UPS is charging the batteries.
UPS IN EMERGENCY!	UPS in emergency.
UPS OFF!	UPS off.
UPS STOPPED!	The UPS has stopped.
NO MAINS	No mains.
VERY HIGH MAINS	The mains voltage is very high but still inside the range allowed.
MAINS OFF TOLL	Mains voltage is out of the range allowed. The UPS switches to battery and bypass is disabled.
MAINS NOT SYNC.	Mains not synchronised; bypass disabled.
INCORRECT SEQUENCE	Invalid input sequence, check correct supply connection.

to be continued next page

8. Diagnostics

FRAMES DISPLAYED WHEN SHUTTING DOWN

Message	Meaning
NO MAINS! START-UP NOT ALLOWED	No mains supply. Start-up not allowed. To start the UPS on battery, select this configuration via the display.
EMERGENCY POWER OFF!	The Emergency Power Off (EPO) is working, the EPO command has been given by a push button or a disconnecting switch on the input line was opened while the UPS was working
CONFIG. INCOMPLETE FOR START-UP!	The UPS requires a complete start-up configuration.
THREE-PHASE CIRCUIT SEQUENCE INCORRECT!	Invalid three-phase input sequence. It needs to be checked.
THE PMs' SW VERSIONS ARE INCORRECT: UPDATE THEM!	One or more Power Modules are programmed with an invalid SW version. An update is necessary. Start the UPS in the Service Mode and update the Power Modules.
START-UP ERROR!	An error occurred during start-up of the UPS.
UPS SHUT DOWN BY PROGRAMMING!	UPS shut down by programming.
SHUTTING DOWN DUE TO AN INCORRECT CONFIGURATION	An error occurred in configuration. UPS in shutting down.
SHUTTING DOWN DUE TO END OF AUTONOMY	Battery charge level is too low, UPS in shutting down.
START-UP WITH BATTERY FAILED	Start-up with battery failed.
MAXIMUM TIME ON BATTERY	Battery autonomy finished. The batteries must be changed.
MAXIMUM TIME ON RESERVE	Reserve autonomy time finished. The UPS is shutting down.
LOAD NOT FED	Load feeding interrupted.

IMPORTANT EVENTS

Message	Meaning
INVERTER FAILURE	Failure occurred in the Inverter circuit.
BOOSTER FAILURE	Failure occurred in the Booster circuit.
BATTERY CHARGER FAILURE	Failure occurred in the Battery Charger circuit.
OVERHEATING	Overheating. Check the UPS ventilation system.
OVERLOAD	Overload. Check the load level connected to the UPS.
EXCESSIVE VOLTAGE ON THE H.V. BUS	Anomalous high voltage on the DC BUS.
EXCESSIVE DC LEVEL IN OUTPUT	The DC (Direct Current) level in output is excessive.
EXCESSIVE BATTERY VOLTAGE	Battery voltage too high.
POWER MODULE COMMUNICATION FAILURE	Failure of the communication system with the Power Modules.
EMERGENCY	Emergency.
LOAD NOT POWERED	Power to the loads has been interrupted.
ABNORMAL SHUTTING DOWN	UPS shut down abnormally
SHUTTING DOWN DUE TO AN OVERLOAD	UPS shut down due to an overload.
SHUTTING DOWN DUE TO AN EMERGENCY POWER OFF	UPS shut down due to an Emergency Power Off.
BATTERIE KO	Battery failure.

8. Diagnostics

SIGNALLING EVENTS

Message	Meaning
SHUTTING DOWN DUE TO END OF AUTONOMY	UPS shut down due to the end of autonomy.
SHUTTING DOWN DUE TO INCORRECT THREE-PHASE SEQUENCE	UPS shut down due to an incorrect three-phase sequence in input.
START-UP WITH BATTERY FAILED	Start-up with battery failed.
BATT.CAL.INTERRUPTED	Battery calibration interrupted.
MAXIMUM TIME ON BATTERY	Maximum time on battery.
MAXIMUM TIME ON RESERVE	Maximum time on autonomy reserve.
START-UP ERROR	Error in starting up.
START-UP AUTHORISED WHEN THERE ARE ONGOING ALARMS	UPS start-up authorised in the presence of alarms.
START-UP AUTHORISED WITH A NEW CONFIG.	UPS start-up authorised with a new configuration.
SHUTTING DOWN DUE TO INCORRECT CONFIGURATION	UPS shutting down due to an incorrect configuration.
POWER MODULE FW UPDATE	The Power Module Firmware updated.

INFORMATION EVENTS

Message	Meaning
STARTUP BY USER N	UPS start-up by user.
SHUTTING DOWN BY USER	UPS shut down by user.
AUTOMATIC STARTUP	Automatic UPS start-up.
DELAYED SHUTTING DOWN	The UPS was shut down by programming a delayed shutdown.
BATTERY CHARGER START IN STANDBY	The battery charger started in standby.
UPS ON BATTERY	UPS on battery.
UPS ON MAINS	UPS on mains.
OUTPUT OFF	The output is off.
BATTERY TEST EXECUTED	Batteries tested.
BATTERIES CALIBRATED	Batteries calibrated.

ALARMS

Message	Meaning
INVERTER FAILURE	Failure occurred in the Inverter circuit.
BOOSTER FAILURE	Failure occurred in the Booster circuit.
BATTERY CHARGER FAILURE	Failure occurred in the Battery Charger circuit.
OVERHEATING	Overheating. Check the UPS ventilation system.
OVERLOAD	Overload. Check the load level connected to the UPS.
HVBUS RUNAWAY	Anomalous high voltage on the DC BUS.
EXC. IN OUT DC LEVEL	Excessive DC voltage in output.
EXCESS.BATTERY V	Battery voltage too high.
MODULE COMMUNICATION FAILED	Failure of the communication system with the Power Modules.
LOAD NOT PROTECTED	Load not protected by the UPS.

9. Maintenance



ATTENTION

The instructions given in this chapter are not addressed to a normal operator but to a specialised technician, authorised to work only if he uses the Personal Protective Gear mentioned in chapter 3.

9.1 Introducing

This chapter contains all the information necessary for a correct maintenance of the UPS Tri Power X33 Mod HP unit.

All the operations described in this section must be carried out by authorised technicians or qualified personnel. ALPHA is not liable for any injury to persons or damage to things caused by incorrect operations or activities if not carried out according to the instructions given in this manual, with particular reference to the safety rules and regulations that can be found in chapter 3.

To ensure optimum operation of the UPS Tri Power X33 Mod HP and continuous and effective protection of the load connected to it, the batteries must be checked every six months after the first year of the machine's life, via the battery calibration function (see par 8.2.4).

9.2 Preventive maintenance

The UPS does not contain parts subject to preventive maintenance by the end user. Therefore, with the exception of normal cleaning, all the user has to do is periodically check there are no alarms on the display and that both fans on each power module are working correctly.

If there are any problems contact the ALPHA assistance centre immediately.

9.3 Periodic checks

Correct operation of the UPS must be guaranteed by periodical maintenance inspections, essential for safeguarding the unit's operating life and reliability.



WARNING

The periodical checks entail operations inside the UPS where dangerous voltages are present. Only maintenance personnel, trained and authorised by ALPHA, know all the parts of the UPS that are live with dangerous voltages and, therefore, authorised to work on them.

During a preventive maintenance inspection, the maintenance technician must check the following:

- there are no alarms;
- the list of any events stored;
- correct operation of the static and maintenance bypass;
- integrity of the electrical installation;
- flow of cooling air;
- condition of the batteries;
- characteristics of the load applied;
- conditions of the installation premises.

9.3.1 Forced bypass mode



ATTENTION

Power modules can be changed without putting the UPS to bypass.

1. Open the door of the UPS Tri Power X33 Mod HP;
2. Enable the UPS forced bypass operation via the front display.
To do this, proceed as follows:
Config. UPS -> Bypass -> Forced Mode Config.;
In these conditions the power modules are excluded and the load is fed directly by the mains.
When the unit is in the forced bypass mode, the front of the panel flashes quickly. Likewise, the LEDs on the various power modules also flash quickly.
3. Turn the manual switch S1 (manual bypass) round to the ON position. The load is now being powered directly by the mains; the wording MANUAL BYPASS appears on the panel.
4. Open the output switch S2;
5. Turn the unit off, pushing down the 'ON/OFF' button on the control panel for a few seconds;
6. Open the mains switch S3;
7. Open the battery disconnecting switches (F B+ and F B-) of the unit and of the Tri Power X33 Mod HP BATTERY units (if present);
8. Push down the "ON/OFF" button for a while in order to discharge internal capacities



ACHTUNG

Im Innern des Geräts befinden sich auch im abgeschalteten Zustand immer noch lebensgefährliche Spannungen auch wenn alle Schalter sowie alle Batterietrennschalter geöffnet sind. Ebenfalls stehen alle Teile, die mit der Lastversorgung in Zusammenhang stehen, unter Spannung. **Eingriffe in das Gerät ist nur geschultem Fachpersonal gestattet.**

9. Maintenance

9.4 Change or install Power module

9.4.1 Power module

1. Make sure that the procedure described in the previous paragraph has been scrupulously applied, see 9.3.1 items 1 to 8;
2. From when the unit is in the manual bypass mode, wait at least ten minutes before extracting the power module: this is to give any residual voltage time to dissipate.



ATTENTION

There are two holes on the body of the module, inside which two LEDs are housed which signal the presence of voltage on the connection terminals. MAKE ABSOLUTELY CERTAIN THAT THESE LEDs ARE OFF before handling the module. If they are on, wait until they have turned off.

3. Extract the module after having loosened the two securing screws.
4. Check the 2 LEDs through the holes that they are off;
5. Put the new power module in the same place of the old one or in one of the available compartments if you wish to increase UPS power.
6. Secure the power module to the unit's frame with the 2 screws provided.

This procedure need no further settings through the display. The UPS recognized the new Power module and make an automatic configuration.

Each Power module has its own identification no. inside the cabinet, where the top left module is no. zero. The numbers are counted from left to right, top to down.



ATTENTION

It is possible that the inserted Power module has not the needed software inside which need to communicate with the UPS. In this case the UPS can not be started up and a message POWER MODULE NOT UPDATED appears on the main frame. Please follow the instructions in the next chapter

9.4.2 Update power module

1. Please ensure that the UPS is in bypass mode; check chapter 9.3.1 items 1 to 8;
2. Start the UPS in SERVICE MODE by pressing the ENTER-key;
3. Follow the menu Powermodule -> Update -> all PM Update. Press ENTER to start the update process;
4. If the process is finished go to the top frame by pressing ESC. Turn the UPS off by pressing ON/OFF-button.

9.4.3 Switching UPS from manual bypass to normal operation

1. Close the mains switch S3.;
2. Close the (F B+ and F B-) switch;
3. Start the unit, pressing the 'ON/OFF' button on the control panel and wait until the status indicator turns violet;
4. Check that the switch S2 is open and confirm with ENTER.
5. Close the output switch S2;
6. Open the bypass switch S1 (the On Line operating mode activates automatically);
7. Close the UPS door.

9.4.4 Battery module

There are existing 2 different procedures to change or install Battery modules at UPS TRI POWER X33 MOD HP® or inside BATTERY TRI POWER X33 MOD HP®. Please follow the instructions below.

Change of Battery modules (HOT-SWAP)



WARNHINWEIS

Only a string of Battery modules should be changed (1 string (1KB) = 4 Battery modules).

Note: If the total number of battery modules changed it is necessary to change the setup of battery KB through the display. In this case it is recommended to start a battery calibration to verify the most accurate autonomy calculation.

For each 10kVA load we recommend 1 KB consists of 4 Battery modules.

1. Ensure that that minimum 1 KB each 10kVA load plus a redundant string is available for the UPS;
2. Ensure that the UPS is not discharging the battery and mains is present. Also ensure that the battery system is in float charge or standby condition. To check the status of the battery system follow the menu UPS Status USV -> Measurements -> Batteries;
3. Extract the screws of the battery modules you want to change (2 screws each module) and put out a complete set KB (4 Battery modules). This 4 battery modules are mounted in a square together;
4. Put the 4 new battery modules in place and fix them with the screws;
5. Repeat item 3 and 4 for other modules.

To mount only additional Battery modules the extract of Battery modules is not needed.



ATTENTION

Only all 4 battery modules (1KB) should be changed together.

Note: If during the battery change a mains fault occurs stop your work immediately. Do not go on mounting or dismounting battery modules. Please do not start again working before the UPS is not again in normal operation.

Note: If during the battery change a mains fault occurs and battery modules missing the autonomy time will decrease.

Change of battery modules at UPS in manual bypass

This procedure is possible for all UPS TRI POWER X33 MOD HP® and BATTERY TRI POWER X33 MOD HP®.



ATTENTION

During the time UPS is in manual bypass the load is supplied by the mains.

1. Ensure the UPS is in manual bypass (please check chapter 9.3.1);
2. Extract the screws of the battery modules you want to change (2 screws each module) and put out a complete set KB (4 Battery modules). This 4 battery modules are mounted in a square together;
3. Put the 4 new battery modules in place and fix them with the screws;
4. Repeat item 2 and 3 for other modules;
5. Put the UPS in normal operation (see chapter 9.3.3).

To mount only additional Battery modules the extract of Battery modules is not needed.

10. Dismantling



ATTENTION

The instructions in this chapter are to be considered indicative. Please refer to the laws in the country where the unit is used.

10.1 Disposing of the batteries

At the end of their life, the batteries must be disposed of in a place set aside for the collection of such waste. Since batteries are toxic waste it is not allowed to dispose of them like traditional waste. For the correct procedure please contact the relevant Authorities in your area.

10.2 Dismantling the UPS

Once the batteries have been removed all the parts of the UPS Tri Power X33 Mod HP must be removed.

To remove and dismantle the unit wear the Individual Protective Gear described in chapter 3 and refer to the instructions and charts that you will find in this manual.

Once the various parts have been removed, divide the components into groups, separating metal from plastic, from copper, etc., according to the selected disposal scheme used in the country where the unit is being dismantled.

If the parts have to be stored while waiting to go to the dump, keep them in a safe place, protected from atmospheric agents to prevent any chance of contamination of the ground and under water tables (especially with lead and the electrolyte of the batteries).

10.3 Dismantling the electronic components

To dispose of these components, for example, the unit's control panel, refer to the laws relevant to this sector.

11. Tables



ATTENTION

The correct type of cable and its size is depending on current and type of installation. The input current together with the rated power are given in chapter 2. The corresponding battery current is given in Tab. 6. This are recommendations; local regulation are valid only.



ATTENTION

The following Tab. give only hints to needed cable size. Type of installation: Single cable with standard isolation PVC, no multicable installation.

Tab. 1

UPS TRI POWER X33 MOD HP recommendet cable size

Rated power	no. of phases input	no. of phases output	cable size input	cable size output
10kVA	3	3	5 x (4mm ²)	5 x (4mm ²)
	1	1	3 x (10mm ²)	3 x (10mm ²)
	1	3	3 x (10mm ²)	5 x (4mm ²)
	3	1	5 x (10mm ²)	3 x (10mm ²)
15/20kVA	3	3	5 x (10mm ²)	5 x (25mm ²)
	1	1	3 x (25mm ²)	3 x (10mm ²)
	1	3	3 x (25mm ²)	5 x (25mm ²)
	3	1	5 x (25mm ²)	3 x (95mm ²)
30kVA	3	3	5 x (16mm ²)	5 x (16mm ²)
40kVA	3	3	5 x (25mm ²)	5 x (25mm ²)
45kVA	3	3	5 x (25mm ²)	5 x (25mm ²)
60kVA	3	3	5 x (35mm ²)	5 x (35mm ²)

Tab. 2

Fuses UPS TRI POWER X33 MOD HP

Rated power	zylinder fuse	
10/15/20 kVA	USV TRI POWER X33 MOD HP® internal battery system	
	FB+	FB-
	N.1 - 50A 500V aR (22 x 58)	N.1 - 50A 500V aR (22 x 58)

Tab. 3

Fuses UPS TRI POWER X33 MOD HP® BATTERY/2

Rated power	zylinder fuse	
10/15/20/30/40/45/60 kVA	USV TRI POWER X33 MOD HP® BATTERY modular 5KB	
	FB+	FB-
	N.5- 50A 500V aR (22 x 58)	N.5 - 50A 500V aR (22 x 58)

11. Tables

Tab. 4
Recommended input automatic breaker

Rated power	switch	no. of phases input/output
10kVA	20A (3P+N) Curve C	3ph - 3ph
	63A (3P+N) Curve C	3ph - 1ph
	63A (1P+N) Curve C	1ph - 1/3ph
15kVA	32A (3P+N) Curve C	3ph - 3ph
	100A (3P+N) Curve C	3ph - 1ph
	100A (1P+N) Curve C	1ph - 1/3ph
20kVA	40A (3P+N) Curve C	3ph - 3ph
	100A (3P+N) Curve C	3ph - 1ph
	100A (1P+N) Curve C	1ph - 1/3ph
30kVA	63A (3P+N) Curve C	3ph - 3ph
40kVA	80A (3P+N) Curve C	3ph - 3ph
45kVA	80A (3P+N) Curve C	3ph - 3ph
60kVA	100A (3P+N) Curve C	3ph - 3ph

Tab. 5
Recommended input fault current circuit breaker (if requested)

Rated power	Fault current
10kVA	$\geq 300\text{mA}$
15kVA	$\geq 300\text{mA}$
20kVA	$\geq 300\text{mA}$
30kVA	$\geq 300\text{mA}$
40kVA	$\geq 300\text{mA}$
45kVA	$\geq 300\text{mA}$
60kVA	$\geq 300\text{mA}$

Tab. 6
Battery current (100% load, at the end of discharge)

Rated power	discharge current	recommended cable size
10kVA	44A	1 x 10mm ² je Pol
15kVA	66A	1 x 16mm ² je Pol
20kVA	88A	1 x 25mm ² je Pol
30kVA	132A	1 x 50mm ² je Pol
40kVA	176A	2 x 35mm ² je Pol
45kVA	198A	2 x 35mm ² je Pol
60kVA	264A	2 x 50mm ² je Pol



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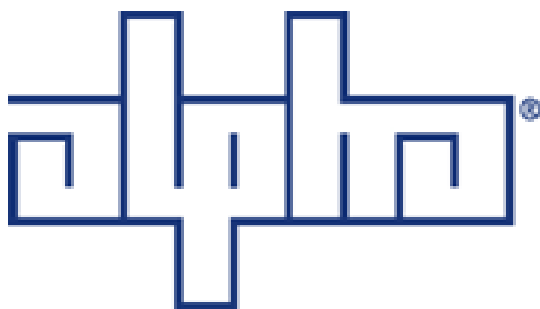
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